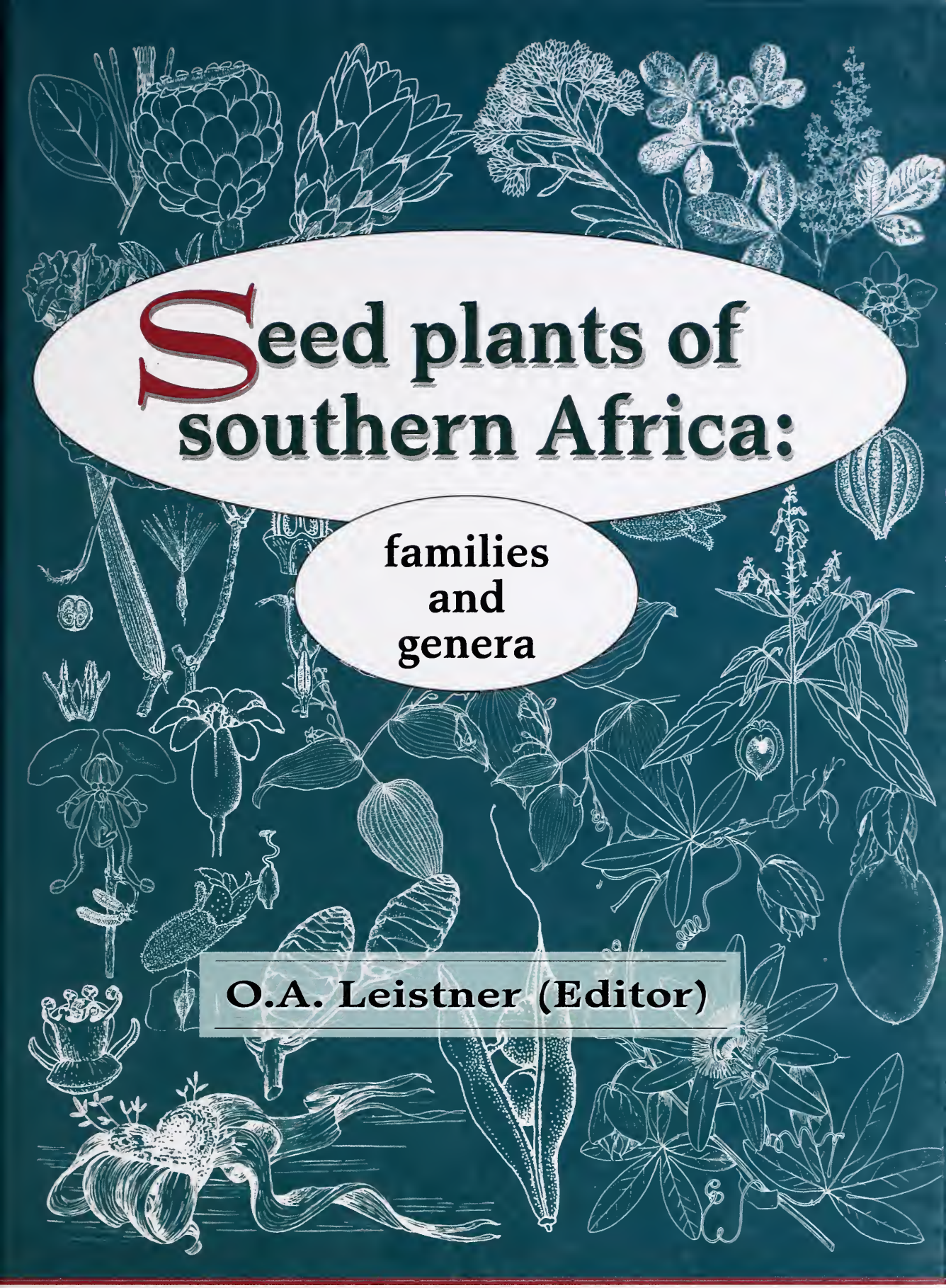

Seed plants of southern Africa:

families and genera

O.A. Leistner (Editor)

STRELITZIA 10

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STRELITZIA 10

Seed plants of southern Africa: families and genera

Editor: O.A. Leistner

NATIONAL
BOTANICAL
INSTITUTE

Pretoria

2000

STRELITZIA

This series has replaced *Memoirs of the Botanical Survey of South Africa* and *Annals of Kirstenbosch Botanic Gardens* which the NBI inherited from its predecessor organisations.

The genus *Strelitzia* occurs naturally in the eastern parts of southern Africa. It comprises three arborescent species, known as wild bananas, and two acaulescent species, known as crane flowers or bird-of-paradise flowers. The logo of the National Botanical Institute is based on the striking inflorescence of *Strelitzia reginae*, a native of the Eastern Cape and KwaZulu-Natal that has become a garden favourite worldwide. It symbolises the commitment of the National Botanical Institute to promote the sustainable use, conservation, appreciation and enjoyment of the exceptionally rich plant life of South Africa, for the benefit of all its people.

TECHNICAL EDITOR	**N.L. Meyer**
EDITORIAL COMMITTEE	**G.F. Smith**, **G. Germishuizen**, **M. Koekemoer** and **E. du Plessis**
CHROMOSOME NUMBERS	**E.J.L. Liebenberg** and **H. du Plessis** (from various sources — see Introduction)
COVER DESIGN	**S. Turck** (incorporating various drawings from the *Flora of southern Africa* series)

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INTRODUCTION

Preamble

'...I would exhort taxonomists to put right the errors and omissions of the present work and to publish a further revision to mark the turn of the century in the year 2000'. Thus wrote Dr R.A. Dyer in the Introduction to the predecessor and basis of the present work: *The genera of southern African flowering plants*, of which volume 1 appeared in 1975.

Since the publication of Dyer's work, plant systematics has entered a renaissance of unprecedented magnitude. New methods and techniques, especially DNA sequencing and cladistics, have provided a wealth of new data. Proposals for improvement of acknowledged systems of plant classification are published almost daily. A branch of Botany, considered by many to be near extinction, is flourishing. With ever-increasing certainty, we can trace the pathways of the evolution of the seed plants and depict them in cladograms (pp. 4–6). Incorporating these new findings and interpretations has proved to be a major challenge in the compilation of this work, which was originally projected to be merely a corrected, updated version of Dyer (1975, 1976).

Area covered

This work covers the same area as the *Flora of southern Africa* (*FSA*): the subcontinent south of the Kunene, Okavango, Zambezi and Limpopo Rivers. In the description of distributions, countries and South African provinces are listed in a more or less north-to-south sequence: Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Northern Cape, Western Cape and Eastern Cape. Botswana was formerly not included in the *FSA* and was also not dealt with in Dyer (1975, 1976).

Arrangement and circumscription of families and genera

In the interest of quick access, this work is basically alphabetically arranged. Bowing to school and textbook tradition, however, families are primarily grouped in three more or less natural assemblages: (1) **Gymnosperms** or non-angiosperm seed plants (pp. 29–33); (2) **Dicotyledons** or Magnoliopsida (pp. 34–565); and (3) **Monocotyledons** or Liliopsida (pp. 566–740). Certain families, such as Annonaceae and Nymphaeaceae, are in many respects intermediate between dicotyledons and monocotyledons. They are often grouped under the name **monosulcates** because most of them, like the majority of monocotyledons, have monosulcate (with a single groove) pollen grains. These families are treated within the alphabetical system of the dicotyledons.

As relationships between families are not indicated by their sequence in this work, their position in the following two classification systems is shown: (1) a modified version of the widely used system of Cronquist (1988) as given in Mabberley (1997); the subclass and order of each family is indicated in brackets before each family description; (2) a combined system by the Angiosperm Phylogeny Group (A.P.G.) (1998) and Judd *et al.* (1999); the relationships of southern African seed plant families are shown on simplified cladograms on pp. 4–6 and the order to which each family is assigned is indicated in the Index (p. 761).

The circumscription of families and genera generally reflects the opinion of the respective compiler. Where this differs from widely held views, it is usually commented on. The presumed phylogenetic position of genera in the larger families is indicated in outlines of the classification after the family descriptions. The number used in PRECIS (National Herbarium, Pretoria (**PRE**) **C**omputerised **I**nformation **S**ystem) (Arnold & De Wet 1993) is given for every genus.

Scope of descriptions and notes

The descriptions of families and genera, as well as the classification of genera within families, are based almost exclusively on southern African material. Only distribution and size of families and genera are also indicated on a worldwide basis. The main source for these figures was Mabberley (1997). Combined family-genus descriptions are given for all families represented locally by only a single genus.

Exotics

Full treatment is given to genera represented by one or more exotic species considered to be growing spontaneously in natural veld and therefore likely to be taken as indigenous. Garden escapes are sometimes mentioned in notes under their family description. Entirely exotic families, genera and species are marked with an asterisk.

Synonyms

Synonyms cited are mainly those found in commonly used literature. Generic synonyms given do not necessarily embrace the entire content of the current genus.

Chromosome numbers

Chromosome numbers given at the end of genus descriptions are primarily based on worldwide data for local genera obtained from the literature listed on p. 2. The following information is given:

1. Basic chromosome numbers (x) established from gametophytic (n) and sporophytic ($2n$) chromosome numbers of species. For example, the basic chromosome number for a genus in which most species are listed in the literature as having chromosome numbers of 7 or 13, whereas only a few of its species have 8 or 9, is given in the present work as $x = 7, 13 (8, 9)$.
2. 'Polyploidy' indicates that $2n = 3x$ to $7x$ and 'high polyploidy' that $2n = 8x$ or higher.
3. B-chromosomes.
4. Aneuploids.

Chromosome numbers in families, such as Scrophulariaceae, in which numerous taxonomic changes have been made recently, should be treated with particular caution.

Chromosome data were extracted by E.J.L. Liebenberg and H. du Plessis from the following sources:

FEDEROV, A. (ed.) 1969. *Chromosome numbers of flowering plants*. V.L. Komarov Botanical Institute, Academy of Sciences of the USSR.

GOLDBLATT, P. (ed.) 1975–1978. Index to plant chromosome numbers. *Monographs in Systematic Botany*, Vol. 5.

GOLDBLATT, P. (ed.) 1979–1981. Index to plant chromosome numbers. *Monographs in Systematic Botany*, Vol. 8.

GOLDBLATT, P. (ed.) 1982–1983. Index to plant chromosome numbers. *Monographs in Systematic Botany*, Vol. 13.

GOLDBLATT, P. (ed.) 1984–1985. Index to plant chromosome numbers. *Monographs in Systematic Botany*, Vol. 23.

GOLDBLATT, P. & JOHNSON, D.E. (eds) 1986–1987. Index to plant chromosome numbers. *Monographs in Systematic Botany*, Vol. 30.

GOLDBLATT, P. & JOHNSON, D.E. (eds) 1988–1989. Index to plant chromosome numbers. *Monographs in Systematic Botany*, Vol. 40.

GOLDBLATT, P. & JOHNSON, D.E. (eds) 1990–1991. Index to plant chromosome numbers. *Monographs in Systematic Botany*, Vol. 51.

GOLDBLATT, P. & JOHNSON, D.E. (eds) 1992–1993. Index to plant chromosome numbers. *Monographs in Systematic Botany*, Vol. 58.

MOORE, R.J. (ed.) 1968. Index to plant chromosome numbers. *Regnum Vegetabile*, Vol. 68.

MOORE, R.J. (ed.) 1969. Index to plant chromosome numbers. *Regnum Vegetabile*, Vol. 77.

MOORE, R.J. (ed.) 1970. Index to plant chromosome numbers. *Regnum Vegetabile*, Vol. 84.

MOORE, R.J. (ed.) 1972. Index to plant chromosome numbers. *Regnum Vegetabile*, Vol. 91.

MOORE, R.J. (ed.) 1973/74. Index to plant chromosome numbers. *Regnum Vegetabile*, Vol. 96.

ORNDORFF, R. (ed.) 1967. Index to plant chromosome numbers. *Regnum Vegetabile*, Vol. 59.

WATSON, L. & DALLWITZ, M. (eds) 1988. *The grass genera of the world*. Research School of Biological Sciences, Australian National University, Canberra.

Compilers

Most of the contributions to this work are by the staff of the three herbaria of the National Botanical Institute. The following researchers from outside the Institute contributed: Prof. Kevin Balkwill of the Botany Department, University of the Witwatersrand; Dr Peter Bruyns of the Bolus Herbarium, University of Cape Town; Dr Leanne Dreyer of the Botany Department, University of Stellenbosch; Dr Peter Goldblatt of the Missouri Botanical Garden, St Louis; Prof. A.V. (Tony) Hall of the Bolus Herbarium, University of Cape Town; Steven Hammer of the Sphaeroid Institute, Vista, U.S.A.; Dr H.E.K. (Heidi) Hartmann of the Institut für Allgemeine Botanik, University of Hamburg; Dr Cornelia Klak of the Bolus Herbarium, University of Cape Town; Dr Ashley Nicholas of the Botany Department, University of Durban-Westville; Prof. Ben-Erik van Wyk of the Botany Department, Rand Afrikaans University; and Prof. Johan Venter of the Department of Botany and Genetics, University of the Free State.

Directions on how to cite the individual contributions by different compilers are given on the back of the title page.

Editor's acknowledgements

My sincere thanks go to the Executive of the National Botanical Institute, specifically Prof. Brian Huntley and Prof. Gideon Smith, for the opportunity to edit a work of such a seminal nature. Nicole Meyer, technical editor, co-ordinator and typesetter, was the king-(or rather queen-)pin of the entire operation; she performed her painstaking work with great dedication, expertise and patience; she also contributed several monocot families. The Editorial Board, comprising Prof. Gideon Smith, Gerrit Germishuizen, Marinda Koekemoer and Emsie du Plessis, gave direction and encouragement. The Publications Section of the NBI played a crucial role in the production of the work and saw it through the press. All members of the section gave their whole-hearted support: Sarie Brink, Emsie du Plessis, Gerrit Germishuizen, Maretha Joubert, Daleen Maree, Beverley Momberg and Sandra Turck, with a special word of thanks to Emsie and Gerrit. All authors, especially those from outside the Institute, who had the option to decline the offer to contribute, are thanked sincerely for their inputs and the spirit of co-operation in which they were made. The names of non-NBI authors are listed under Compilers above. Robert Westfall of the Agricultural Research Council spent many hours computing family attributes (some preliminary results are apparent in *Identification of families*, p. 7); Peter Goldblatt and John Manning provided thoughts on classification of families, and glimpses into the manuscript of their forthcoming publication on Cape plants (in prep.); they also contributed the account of Iridaceae. Dee (Snijman) Paterson-Jones gave advice on monocots. Mabberley's *Plant-book* was a daily source of information and inspiration; he has accomplished the almost impossible—nay, the impossible: can you make our dear friend Franz Schubert live backwards? Mariette, my better half, spent many nights playing the plant family game on the computer, and unquestioningly accepted The Book as an excuse for any non-co-operation in the domestic realm.

Sponsors

The Trustees of the Mia Karsten Fund kindly approved a considerable contribution towards the printing cost of this work.

Literature

No formal cut-off date for the inclusion of new literature was fixed but the aim was to reflect the current state of knowledge. That aim was reached with varying degrees of success. The literature consulted in the compilation of families is given at the end of each family treatment. Dyer (1975, 1976) is not routinely cited. Literature referred to above, as well as much-used sources of a general nature consulted in the course of editing, include the following:

A.P.G. 1998. An ordinal classification for the families of flowering plants. *Annals of the Missouri Botanical Garden* 85: 531–553.

ARNOLD, T.H. & DE WET, B.C. (eds) 1993. Plants of southern Africa: names and distribution. *Memoirs of the Botanical Survey of South Africa* No. 62.

BRUMMITT, R.K. (compiler) 1992. *Vascular plant families and genera.* Royal Botanic Gardens, Kew.

BRUMMITT, R.K. & POWELL, C.E. (eds) 1992. *Authors of plant names.* Royal Botanic Gardens, Kew.

BURGER, W.C. 1967. *Families of flowering plants in Ethiopia.* Oklahoma State University Press, Stillwater, Oklahoma.

CRONQUIST, A. 1988. *The evolution and classification of flowering plants,* edn 2. New York Botanical Garden, Bronx, New York.

CULLEN, J. 1997. *The identification of flowering plant families*, edn 4. Cambridge University Press, Cambridge.

DYER, R.A. 1975. *The genera of southern African flowering plants.* 1. Dicotyledons. Botanical Research Institute, Pretoria.

DYER, R.A. 1976. *The genera of southern African flowering plants.* 2. Gymnosperms and monocotyledons. Botanical Research Institute, Pretoria.

GOLDBLATT, P. & MANNING, J.C. (in prep.) Cape plants. A conspectus of the Cape flora of South Africa. *Strelitzia* 9.

GREUTER, W., BRUMMITT, R.K., FARR, E., KILIAN, N., KIRK, P.M. & SILVA, P.C. 1993. *NCU-3, Names in current use for extant plant genera.* Koeltz Scientific Books, Königstein, Germany.

HEYWOOD, V.H. (consult. ed.) 1979. *Flowering plants of the world.* Oxford University Press, Oxford, London, Melbourne.

JUDD, W.S., CAMPBELL, C.S., KELLOGG, E.A. & STEVENS, P.F. 1999. *Plant systematics: a phylogenetic approach.* Sinauer Associates, Sunderland, Massachusetts.

LAWRENCE, G.H.M., BUCHHEIM, A.F.G., DANIELS, G.S. & DOLEZAL, H. 1968. *B-P-H. Botanico-Periodicum-Huntianum.* Hunt Botanical Library, Pittsburgh, Pa.

MABBERLEY, D.J. 1997. *The plant-book.* Cambridge University Press, Cambridge.

STAFLEU, F.A. & COWAN, R.S. 1976–1988. *Taxonomic literature* 1–7, edn 2. Bohn, Scheltema & Holkema, Utrecht/ Junk, The Hague.

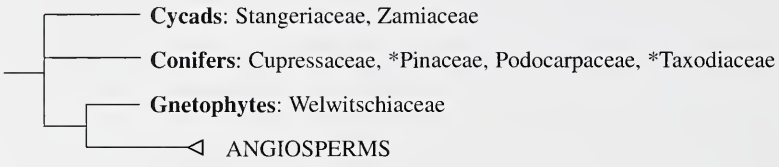
TAKHTAJAN, A. 1997. *Diversity and classification of flowering plants.* Columbia University Press, New York.

VAN WYK, B. [A.E.] & VAN WYK, P. 1997. *Field guide to trees of southern Africa.* Struik, Cape Town.

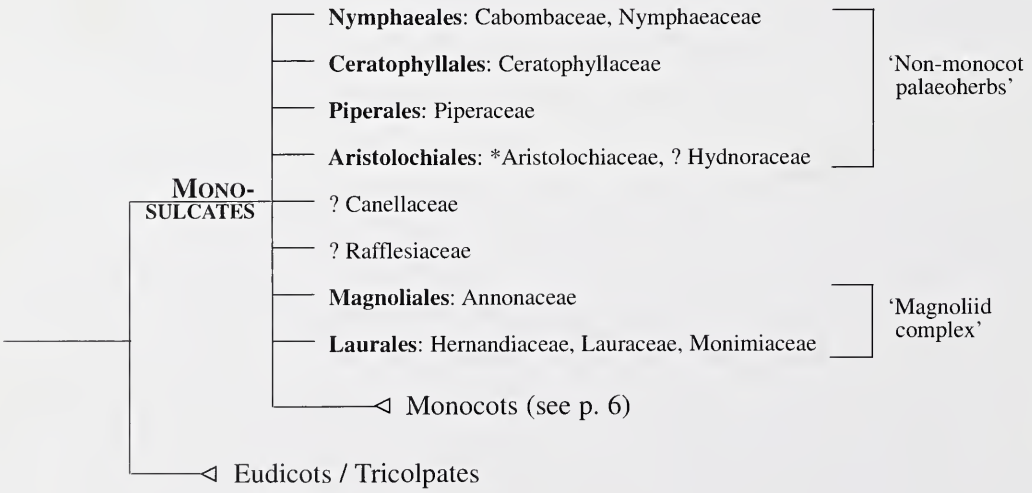
CLASSIFICATION OF FAMILIES

In this work families are arranged alphabetically under (1) gymnosperms, (2) dicotyledons, and (3) monocotyledons. The relationships between families are therefore scarcely reflected by their position. A knowledge of the phylogenetic situation of a family, however, is essential if it is to be seen in a wider context. From the numerous classification systems proposed for the families of seed plants, two are reflected here, with only occasional slight changes: (1) the system by Cronquist (1988, *The evolution and classification of flowering plants*) which is widely used, for example in the *Flora of Australia*. It is given here in the modified version as presented in Mabberley (1997, *The plant-book*). The subclass and the order into which each family is placed in this system is shown in brackets before the description of the family. Thanks to new techniques and procedures the insight into the phylogeny of plants is improving very rapidly. The latest available classification was chosen: (2) a system based on the recent publication of the Angiosperm Phylogeny Group (A.P.G. 1998, *Annals of the Missouri Botanical Garden* 85: 531–553) and on Judd *et al.* (1999, *Plant systematics: a phylogenetic approach*). It is displayed in the simplified cladograms below in which only families recorded from southern Africa are included. The order to which each family is assigned is also given in the Index (p. 761). A question mark indicates that the position of the family is uncertain. Unplaced families are listed after the asterids (p. 6).

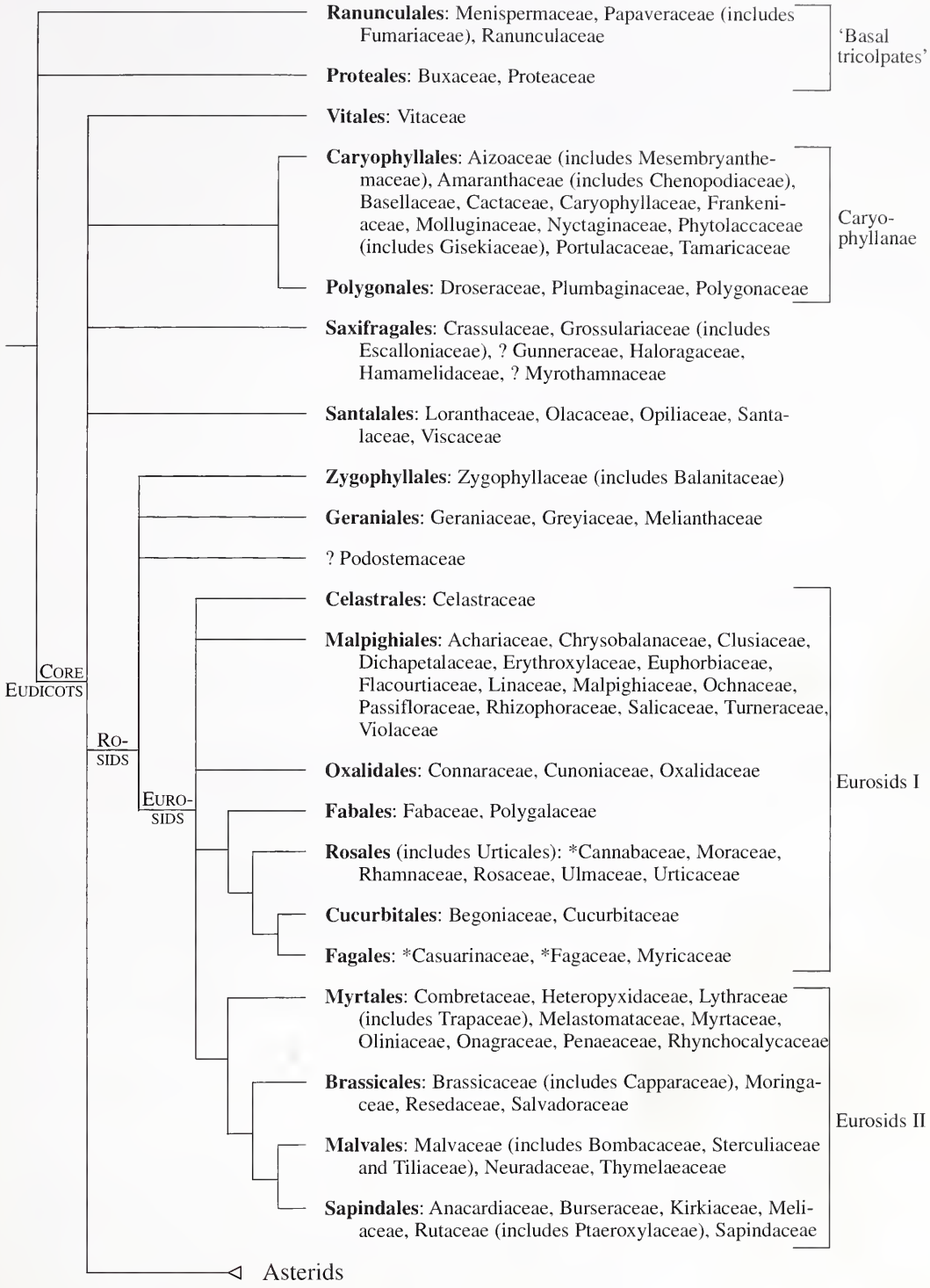
'GYMNOSPERMS'/'NON-ANGIOSPERM SEED PLANTS'



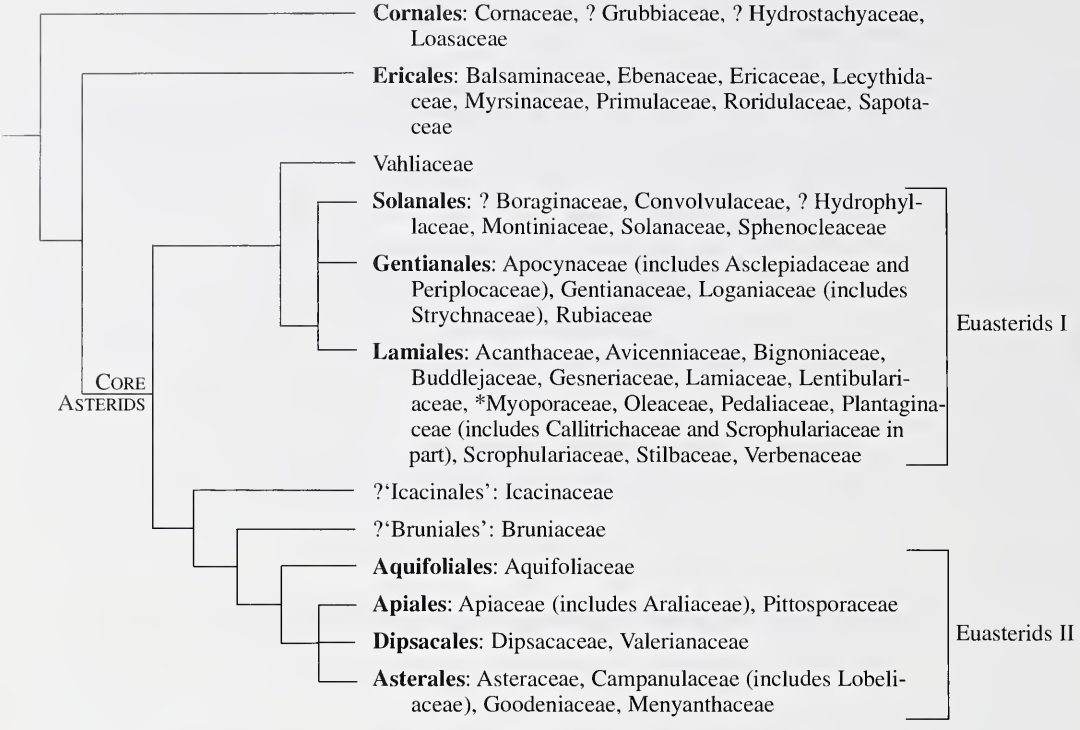
ANGIOSPERMS



EUDICOTS / TRICOLPATES

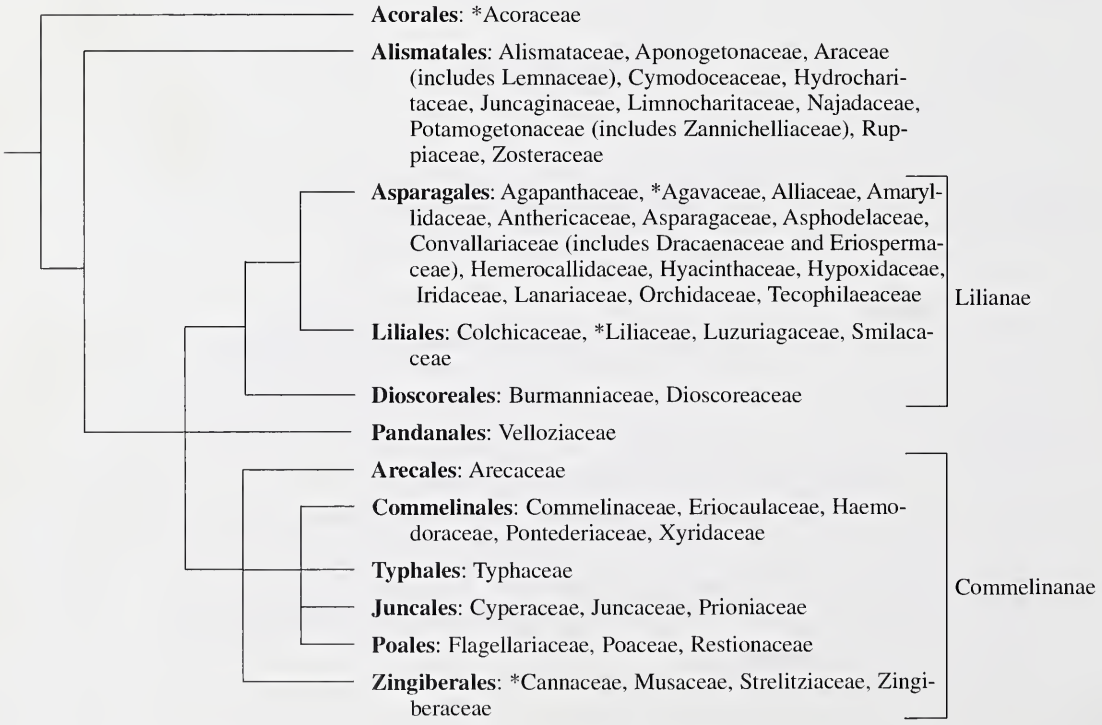

Ranunculales: Menispermaceae, Papaveraceae (includes Fumariaceae), Ranunculaceae
Proteales: Buxaceae, Proteaceae
'Basal tricolpates'
Vitales: Vitaceae
Caryophyllales: Aizoaceae (includes Mesembryanthemaceae), Amaranthaceae (includes Chenopodiaceae), Basellaceae, Cactaceae, Caryophyllaceae, Frankeniaceae, Molluginaceae, Nyctaginaceae, Phytolaccaceae (includes Gisekiaceae), Portulacaceae, Tamaricaceae
Polygonales: Droseraceae, Plumbaginaceae, Polygonaceae
Caryophyllanae
Saxifragales: Crassulaceae, Grossulariaceae (includes Escalloniaceae), ? Gunneraceae, Haloragaceae, Hamamelidaceae, ? Myrothamnaceae
Santalales: Loranthaceae, Olacaceae, Opiliaceae, Santalaceae, Viscaceae
Zygophyllales: Zygophyllaceae (includes Balanitaceae)
Geraniales: Geraniaceae, Greyiaceae, Melianthaceae
? Podostemaceae
Celastrales: Celastraceae
Malpighiales: Achariaceae, Chrysobalanaceae, Clusiaceae, Dichapetalaceae, Erythroxylaceae, Euphorbiaceae, Flacourtiaceae, Linaceae, Malpighiaceae, Ochnaceae, Passifloraceae, Rhizophoraceae, Salicaceae, Turneraceae, Violaceae
CORE EUDICOTS
ROSIDS
EUROSIDS
Oxalidales: Connaraceae, Cunoniaceae, Oxalidaceae
Fabales: Fabaceae, Polygalaceae
Rosales (includes Urticales): *Cannabaceae, Moraceae, Rhamnaceae, Rosaceae, Ulmaceae, Urticaceae
Cucurbitales: Begoniaceae, Cucurbitaceae
Fagales: *Casuarinaceae, *Fagaceae, Myricaceae
Eurosids I
Myrtales: Combretaceae, Heteropyxidaceae, Lythraceae (includes Trapaceae), Melastomataceae, Myrtaceae, Oliniaceae, Onagraceae, Penaeaceae, Rhynchocalycaceae
Brassicales: Brassicaceae (includes Capparaceae), Moringaceae, Resedaceae, Salvadoraceae
Malvales: Malvaceae (includes Bombacaceae, Sterculiaceae and Tiliaceae), Neuradaceae, Thymelaeaceae
Sapindales: Anacardiaceae, Burseraceae, Kirkiaceae, Meliaceae, Rutaceae (includes Ptaeroxylaceae), Sapindaceae
Eurosids II
Asterids

ASTERIDS


Cornales: Cornaceae, ? Grubbiaceae, ? Hydrostachyaceae, Loasaceae
Ericales: Balsaminaceae, Ebenaceae, Ericaceae, Lecythidaceae, Myrsinaceae, Primulaceae, Roridulaceae, Sapotaceae
Vahliaceae
Solanales: ? Boraginaceae, Convolvulaceae, ? Hydrophyllaceae, Montiniaceae, Solanaceae, Sphenocleaceae
Gentianales: Apocynaceae (includes Asclepiadaceae and Periplocaceae), Gentianaceae, Loganiaceae (includes Strychnaceae), Rubiaceae
Lamiales: Acanthaceae, Avicenniaceae, Bignoniaceae, Buddlejaceae, Gesneriaceae, Lamiaceae, Lentibulariaceae, *Myoporaceae, Oleaceae, Pedaliaceae, Plantaginaceae (includes Callitrichaceae and Scrophulariaceae in part), Scrophulariaceae, Stilbaceae, Verbenaceae
Euasterids I
CORE ASTERIDS
?'Icacinales': Icacinaceae
?'Bruniales': Bruniaceae
Aquifoliales: Aquifoliaceae
Apiales: Apiaceae (includes Araliaceae), Pittosporaceae
Dipsacales: Dipsacaceae, Valerianaceae
Asterales: Asteraceae, Campanulaceae (includes Lobeliaceae), Goodeniaceae, Menyanthaceae
Euasterids II

Families unplaced: Balanophoraceae, Elatinaceae, Geissolomataceae

MONOCOTS


Acorales: *Acoraceae
Alismatales: Alismataceae, Aponogetonaceae, Araceae (includes Lemnaceae), Cymodoceaceae, Hydrocharitaceae, Juncaginaceae, Limnocharitaceae, Najadaceae, Potamogetonaceae (includes Zannichelliaceae), Ruppiaceae, Zosteraceae
Asparagales: Agapanthaceae, *Agavaceae, Alliaceae, Amaryllidaceae, Anthericaceae, Asparagaceae, Asphodelaceae, Convallariaceae (includes Dracaenaceae and Eriospermaceae), Hemerocallidaceae, Hyacinthaceae, Hypoxidaceae, Iridaceae, Lanariaceae, Orchidaceae, Tecophilaeaceae
Liliales: Colchicaceae, *Liliaceae, Luzuriagaceae, Smilacaceae
Dioscoreales: Burmanniaceae, Dioscoreaceae
Lilianae
Pandanales: Velloziaceae
Arecales: Arecaceae
Commelinales: Commelinaceae, Eriocaulaceae, Haemodoraceae, Pontederiaceae, Xyridaceae
Typhales: Typhaceae
Juncales: Cyperaceae, Juncaceae, Prioniaceae
Poales: Flagellariaceae, Poaceae, Restionaceae
Commelinanae
Zingiberales: *Cannaceae, Musaceae, Strelitziaceae, Zingiberaceae

IDENTIFICATION OF FAMILIES

Introduction

The first step in identifying a plant is usually to ascertain the family to which it belongs. This can be a formidable task in a region such as southern Africa with some 230 families of seed plants, many with very diverse representatives. The readily available vegetative characteristics are usually not enough to distinguish families, and a knowledge of flower features is essential. In many families the flower structure has become modified to a lesser or greater extent, or flowers may be very small and hidden between bracts, such as in the grasses (Poaceae), or inside an almost completely closed flower receptacle, as in the figs (Moraceae). In the paragraphs below, a few ideas and data are given which may help to make the task of identifying families a little easier.

Aids to identification

General hints

The systematic examination of a plant in order to establish the characteristics required for its identification is described in detail in Cullen (1997). A few sentences from his work concerning ovary and ovule features are quoted here because these are often particularly difficult to determine: 'In order to see how many cells [locules] the ovary contains, it is usually necessary to section it horizontally across the middle [the widest part]. Such a section will also generally show how many ovules there are in the ovary or in each locule, and, very often, the way they are attached to the ovary—the placentation, which is a very important characteristic in the identification of families. With some groups it may also be necessary to cut another ovary longitudinally (along a diameter) to see precisely how the ovules are attached. The cutting of ovaries....is an art that has to be mastered with practice, as the ovaries can be very small indeed. In general terms it is relatively easy to cut a transverse section, using a single-edged razor blade. Longitudinal sections can be difficult and troublesome. The flower (or just the ovary, if it is large enough) should be held between finger and thumb, with the flower in the same position as it was on the plant, with the stem end pointing outwards. A cut should then be made carefully through this, moving the blade downwards as the cut goes through the tissues. In this way, clean surfaces will be left and the ovary will not be squeezed or squashed, which will happen if a sawing motion of the blade is used. It is sometimes helpful to rub over the ends of cut sections with the tip of a broad, black, felt-tip pen. The water-based ink is absorbed by the cut surfaces, which therefore stain black, but it is repelled by the waxy surface of the ovules, which are pale green and stand out from the rest of the stained cut.' A note by Goldblatt & Manning (in prep.: *Cape plants. A conspectus of the Cape flora of South Africa*) at the beginning of their key to angiosperms is also relevant in this context: 'In checking placentation it is often easier to examine ovaries after fertilisation when they have swollen slightly.'

Characteristics found only in a limited number of families

Certain distinctive attributes encountered in some or all members of a limited number of families may prove helpful when identifying plants (G—gymnosperms; M—monocotyledons; all others—dicotyledons):

Water plants, free-floating or with floating leaves:
Alismataceae (M), Aponogetonaceae (M), Araceae (M), Cabombaceae, Crassulaceae, Droseraceae, Hydrocharitaceae (M), Lemnaceae (M), Lentibulariaceae, Limnocharitaceae (M), Lythraceae, Menyanthaceae, Nymphaeaceae, Onagraceae, Podostemaceae, Pontederiaceae (M), Potamogetonaceae (M), Scrophulariaceae, Trapaceae.

Water plants, with submerged stems and leaves:
Alismataceae (M), Aponogetonaceae (M), Callitrichaceae, Ceratophyllaceae, Cymodoceaceae (M), Droseraceae, Elatinaceae, Haloragaceae, Hydrocharitaceae (M), Hydrostachyaceae, Lentibulariaceae, Limnocharitaceae (M), Lythraceae, Najadaceae (M), Onagraceae, Podostemaceae, Potamogetonaceae (M), Ranunculaceae, Ruppiaceae (M), Scrophulariaceae, Zannichelliaceae (M), Zosteraceae (M).

Parasitic plants:
(1) Without chlorophyll: Balanophoraceae, Convolvulaceae, Hydnoraceae, Lauraceae, Rafflesiaceae, Scrophulariaceae; (2) growing on aerial parts of trees and shrubs: Loranthaceae, Viscaceae.

Grasses and grass-like plants:
Cyperaceae (M), Juncaceae (M), Poaceae (M), Restionaceae (M), Typhaceae (M).

Succulent plants:
*Agavaceae (M), Aizoaceae, Amaranthaceae, Amaryllidaceae (M), Apocynaceae, Asphodelaceae (M), Asteraceae, Balsaminaceae, Begoniaceae, Boraginaceae (*Heliotropium curassavicum*), Cactaceae, Chenopodiaceae, Crassulaceae, Dracaenaceae (M), Euphorbiaceae, Geraniaceae, Goodeniaceae, Hyacinthaceae (M), Hydnoraceae, Lamiaceae, Lemnaceae (M), Loranthaceae, Menispermaceae, Mesembryanthemaceae, Molluginaceae, Orchidaceae (M), Passifloraceae, Pedaliaceae, Phytolaccaceae, Piperaceae, Polygonaceae, Portulacaceae, Rafflesiaceae, Rubiaceae (*Phylohydrax*), Scrophulariaceae, Viscaceae, Vitaceae, Zygophyllaceae.

Plants with true bulbs:
Alliaceae (M), Amaryllidaceae (M), Hyacinthaceae (M), *Liliaceae (M).

Plants with milky or coloured to conspicuous watery sap:
Alismataceae (M), Apocynaceae, Araceae (M), Asteraceae, Burseraceae, Cabombaceae, Campanulaceae, Convolvulaceae (some spp. of *Ipomoea*), Euphorbiaceae, Fumariaceae, Haemodoraceae (M), Limnocharitaceae (M), Lobeliaceae, Moraceae, Moringaceae, Nymphaeaceae, Papaveraceae, Sapotaceae.

Stem twining:
Achariaceae, Annonaceae, Apocynaceae, Aristolochiaceae, Basellaceae, Connaraceae, Convolvulaceae, Dioscoreaceae (M), Euphorbiaceae, Fabaceae, Flagellariaceae (M), Hyacinthaceae (M), Lauraceae, Linaceae, Luzuriagaceae (M), Malpighiaceae, Menispermaceae, Oleaceae, Polygonaceae, Solanaceae.

Tendrils present:
Achariaceae, Apocynaceae, Bignoniaceae, Colchicaceae (M), Cucurbitaceae, Fabaceae, Flagellariaceae (M), Fumariaceae, Linaceae, Menispermaceae, Passifloraceae, Rhamnaceae, Sapindaceae, Smilacaceae (M), Vitaceae.

Leaves absent or reduced to scales:
Amaranthaceae, Apocynaceae, Asparagaceae (M), Asteraceae, Bruniaceae, Burmanniaceae (M), Cactaceae, Campanulaceae, *Casuarinaceae, Chenopodiaceae, Convolvulaceae, Cucurbitaceae, Cupressaceae (G), Euphorbiaceae, Geraniaceae, Hyacinthaceae (M), Hydnoraceae, Juncaceae (M), Lauraceae, Lemnaceae (M), Mesembryanthemaceae, Orchidaceae (M), Podostemaceae, Rafflesiaceae, Restionaceae (M), Santalaceae, Scrophulariaceae, Viscaceae, Zannichelliaceae (M).

Leaves digitately compound (3 to many leaflets):
Anacardiaceae, Apiaceae, Araliaceae, Araceae (M), Arecaceae (M), Bignoniaceae, Bombacaceae, Burseraceae, *Cannabaceae, Capparaceae, Ceratophyllaceae, Cucurbitaceae, Cunoniaceae, Dioscoreaceae (M), Droseraceae, Euphorbiaceae, Fabaceae, Fumariaceae, Geraniaceae, Lamiaceae, Lentibulariaceae, Malvaceae, Oleaceae, Oxalidaceae, Passifloraceae, Pedaliaceae, Ranunculaceae, Rosaceae, Rutaceae, Sapindaceae, Sterculiaceae, Verbenaceae, Vitaceae, Zygophyllaceae.

Leaves paripinnate:
Araliaceae, Balanitaceae, Fabaceae (especially Caesalpinioideae), Hydrostachyaceae, Meliaceae, Oxalidaceae, Ptaeroxylaceae, Sapindaceae, Stangeriaceae (G), Zamiaceae (G) Zygophyllaceae.

Leaves imparipinnate:
Anacardiaceae, Apiaceae, Araceae (M), Arecaceae (M), Asteraceae, Bignoniaceae, Brassicaceae, Burseraceae, Connaraceae, Cunoniaceae, Fabaceae, Fumariaceae, Geraniaceae, Haloragaceae, Hydrophyllaceae, Hydrostachyaceae, Kirkiaceae, Meliaceae, Melianthaceae, Moringaceae, Oleaceae, Proteaceae, Ranunculaceae, Resedaceae, Rosaceae, Rutaceae, Sapindaceae, Stangeriaceae (G), Valerianaceae, Zamiaceae (G), Zygophyllaceae.

Leaves 2× or 3× pinnate:
Apiaceae, Araliaceae, Araceae (M), Asteraceae, Bignoniaceae, Fabaceae, Fumariaceae, Geraniaceae, Hydrostachyaceae, Lentibulariaceae, Meliaceae, Moringaceae, Proteaceae, Ranunculaceae.

Flowers densely crowded, sessile, usually small to minute; in heads, on a fleshy axis surrounded by a conspicuous bract, or enclosed as in a fig; inflorescence often resembling a single flower:
Amaranthaceae, Apiaceae, Araceae (M), Araliaceae, Asteraceae, Balanophoraceae, Bruniaceae, *Casuarinaceae, Colchicaceae (M), Convolvulaceae, Dipsacaceae, Eriocaulaceae (M), Euphorbiaceae (*Euphorbia*), Fabaceae (Mimosoideae), Gentianaceae, Hamamelidaceae, Hyacinthaceae (M), Juncaceae (M), Moraceae, Portulacaceae, Proteaceae, Rhamnaceae (*Phylica*), Rubiaceae, Thymelaeaceae, Urticaceae, Verbenaceae, Xyridaceae (M).

Flowers in an umbel or pseudo-umbel:
Agapanthaceae (M), Alismataceae (M), Alliaceae (M), Amaryllidaceae (M), Anthericaceae (M), Apiaceae, Apocynaceae, Araliaceae, Capparaceae, Cyperaceae (M), Euphorbiaceae, Fabaceae, Geraniaceae, Gisekiaceae, Hydrocharitaceae (M), Iridaceae (M), Limnocharitaceae (M), Loranthaceae, Malpighiaceae, Menyanthaceae, Molluginaceae, Myrsinaceae, Myrtaceae, Nyctaginaceae, Oxalidaceae, Ranunculaceae, Rhamnaceae, Ruppiaceae (M), Rutaceae, Smilacaceae (M), Solanaceae, Thymelaeaceae, Viscaceae.

Perianth absent:
Amaranthaceae, Araceae (M), Asteraceae, Balanophoraceae, Begoniaceae, Callitrichaceae, *Casuarinaceae, Chenopodiaceae, Cupressaceae (G), Cymodoceaceae (M), Cyperaceae (M), Euphorbiaceae, Fabaceae (*Brachystegia*), Gunneraceae, Haloragaceae, Hydrostachyaceae, Lemnaceae (M), Moraceae, Myricaceae, Myrothamnaceae, Najadaceae (M), Pinaceae (G), Piperaceae, Poaceae (M), Podostemaceae, Podocarpaceae (G), Potamogetonaceae (M), Restionaceae (M), Ruppiaceae (M), Salicaceae, Stangeriaceae (G), *Taxodiaceae (G), Typhaceae (M), Viscaceae, Zamiaceae (G), Zannichelliaceae (M), Zosteraceae (M).

Perianth dry, pergamentaceous:
Amaranthaceae, *Cannabaceae, *Casuarinaceae, Cyperaceae (M), Eriocaulaceae (M), Juncaceae (M), Moraceae, Plantaginaceae, Poaceae(M), Restionaceae (M), Typhaceae (M), Xyridaceae (M).

Perianth spurred:
Balsaminaceae, Brassicaceae, Lentibulariaceae, Orchidaceae (M), Pedaliaceae, Scrophulariaceae, Valerianaceae, Violaceae.

Sex organs, at least of one sex, in cones or catkins:
*Casuarinaceae, Cupressaceae (G), Euphorbiaceae, *Fagaceae, Gunneraceae, Moraceae, Myricaceae, Myrothamnaceae, *Pinaceae (G), Podocarpaceae (G), Salicaceae, Stangeriaceae (G), *Taxodiaceae (G), Welwitschiaceae (G), Zamiaceae (G).

Anthers connate:
Apocynaceae, Araceae (M), Asteraceae, Balsaminaceae, Cucurbitaceae, Fumariaceae, Gentianaceae, Hydnoraceae, Lobeliaceae, Rafflesiaceae, Scrophulariaceae, Violaceae.

Gynoecium of 2 or more free carpels with separate styles:
Alismataceae (M), Annonaceae, Aponogetonaceae (M), Arecaceae (M), Cabombaceae, Connaraceae, Crassulaceae, Cymodoceaceae (M), Gisekiaceae, Juncaginaceae (M), Limnocharitaceae (M), Menispermaceae, Nymphaeaceae, Phytolaccaceae, Potamogetonaceae (M), Ranunculaceae, Rosaceae, Ruppiaceae (M), Zannichelliaceae (M).

Fruit a circumscissile capsule: opening by a lid:
Aizoaceae, Hypoxidaceae (M), Lentibulariaceae, Lythraceae, Plantaginaceae, Plumbaginaceae, Portulacaceae, Primulaceae, Sphaenocleaceae.

Keys to families

KEY TO MAJOR GROUPS

1a Flowers absent; ovules/seeds borne on scales arranged in cones, or exposed, not in an ovary; pollen sacs borne on scales arranged in cones; trees to woody perennials; leaves mostly needle-, scale- or palm-like ..... **GYMNOSPERMS** (key below)

1b Flowers present; ovules/seeds enclosed in an ovary; pollen borne in anthers; annual herbs to trees (**ANGIOSPERMS**):

2a Leaves usually net-veined, simple to variously compound, often with a petiole, base rarely sheathing the stem (e.g. Apiaceae, Ranunculaceae); stipules present or absent; flower parts usually in 4s or 5s; vascular bundles in stem usually arranged in a cylinder; embryo usually with 2 cotyledons..... **DICOTYLEDONS** (key on p. 10)

2b Leaves usually with parallel-convergent veins, simple or rarely compound or lobed but then leaflets or lobes with parallel, not net-like venation, leaves rarely with a petiole but base usually sheathing the stem at least partly; stipules absent; flower parts usually in 3s; vascular bundles scattered in stem; embryo with 1 cotyledon..... **MONOCOTYLEDONS** (key on p. 25)

KEY TO GYMNOSPERMS (pp. 29–33)

1a Leaves 2, opposite, permanent, sprawling on the ground and often torn lengthwise by the wind ..... **WELWITSCHIACEAE**

1b Leaves indefinite in number, produced in succession from apex of stems:

2a Palm- or fern-like plants with fibrous stems or trunks, or stemless with a tuberous rootstock:

3a Stemless, somewhat fern-like plants with a tuberous rootstock; leaves deciduous from their base; leaflets with midrib and dichotomously branched lateral veins..... **STANGERIACEAE**

3b Stems above and below ground, covered with persistent leaf bases, sometimes up to 10 m tall, with a crown of palm-like leaves..... **ZAMIACEAE**

2b Trees or shrubs with hardwood stems and simple leaves along branches:

4a Leaves small and scale-like; ovules/seeds borne between scales of a rounded woody, rarely fleshy cone..... **CUPRESSACEAE**

4b Leaves well developed, linear to awl-shaped or needle-like:

5a Dioecious trees or shrubs; leaves linear to narrowly ovate; ovules/seeds 1 or 2 borne on a receptacle (often swollen and fleshy), not in cones ..... **PODOCARPACEAE**

5b Monoecious trees or shrubs; leaves needle-like, linear or awl-shaped; ovules/seeds borne in cones:

6a Leaves mostly needle-like, 1 or few united at base by a membranous sheath; female cones with many spirally arranged scales, leathery or fleshy at first, mostly becoming stiff and woody later, each bearing 2 ovules/seeds..... ***PINACEAE**

6b Leaves mostly linear to broadly awl-shaped, without a basal sheath, spirally arranged but sometimes appearing 2-ranked; female cones with 5–30 scales, free when young but closely fused later, each bearing 2–9 ovules... ***TAXODIACEAE**

KEY TO DICOTYLEDONS (pp. 34–565)

1a Gynoecium composed of 2 or more **free carpels** with separate styles and stigmas (in Nymphaeaceae the carpels are sunk in a fleshy disc):
2a Petals absent; perianth members all ± similar ..... **Group 1** (below)
2b Petals present ..... **Group 2** (below)
1b Gynoecium composed of **1 carpel** or of 2 or more **united carpels** with united or free styles, or if carpels free below then styles or stigmas united:
3a **Placentation parietal or marginal**: ovules 2 or more in the ovary, borne on its outer wall or sometimes on intrusions thereof:
4a Ovary superior:
5a Petals absent; perianth members, if present, all ± similar ..... **Group 3** (p. 11)
5b Petals free ..... **Group 4** (p. 11)
5c Petals ± united ..... **Group 5** (p. 12)
4b Ovary ± inferior ..... **Group 6** (p. 13)
3b **Placentation axile, basal or apical**: 1 or more ovules in the ovary, borne on the central axis, or the base or apex of the ovary, or placentation indistinct:
6a Ovary superior:
7a Petals absent; perianth members, if present, all ± similar ..... **Group 7** (p. 13)
7b Petals free ..... **Group 8** (p. 16)
7c Petals ± united ..... **Group 9** (p. 19)
6b Ovary inferior:
8a Petals absent; perianth members, if present, all ± similar ..... **Group 10** (p. 22)
8b Petals free ..... **Group 11** (p. 23)
8c Petals ± united ..... **Group 12** (p. 24)

GROUP 1 (*Carpels free; petals absent*)

1a Sepals united below; stamens perigynous, arising at mouth of calyx tube; leaves pinnate or digitate or palmately lobed; stipules present; trees, shrubs or herbs, sometimes scrambling with prickles ..... **ROSACEAE**
1b Sepals free; stamens hypogynous:
2a Leaves compound, sometimes decompound; sepals petaloid; herbs or soft-wooded climbing or trailing plants..... **RANUNCULACEAE**
2b Leaves simple:
3a Flowers unisexual; plants dioecious; woody climbers with alternate leaves:
4a Sepals 6–18 in 2 or more whorls; stamens 3–6, free or united into a synandrium; flowers in cymes or racemes; leaves entire or palmately lobed ..... **MENISPERMACEAE**
4b Sepals 4 or 5 in 1 whorl; stamens 10–15, free; flowers in elongated racemes; leaves entire..... **PHYTOLACCACEAE**
3b Flowers bisexual; herbs with opposite or subopposite leaves:
5a Leaves entire; calyx herbaceous; flowers small, in cymes or panicles ..... **GISEKIACEAE**
5b Leaves toothed or lobed; calyx petaloid; flowers large and conspicuous, solitary or few together..... **RANUNCULACEAE**

GROUP 2 (*Carpels free; petals present*)

1a Leaves opposite; stipules absent; carpels as many as petals; plants often succulent ..... **CRASSULACEAE**
1b Leaves alternate, sometimes all radical:
2a Aquatic herbs with floating leaves on long petioles; leaf blades ± peltate; flowers solitary, on long scapes, often large and conspicuous:
3a Carpels sunk in a fleshy disc; petals many; leaf blades cordate as well as peltate ..... **NYMPHAEACEAE**
3b Carpels not sunk in a fleshy disc; petals 3; leaf blades peltate, not cordate ..... **CABOMBACEAE**
2b Terrestrial plants; leaf blades not peltate:
4a Stamens perigynous, arising at mouth of calyx tube; leaves pinnate or digitate; stipules present; trees, shrubs or herbs, sometimes scrambling with prickles ..... **ROSACEAE**
4b Stamens hypogynous, not arising on calyx:
5a Sepals 6–24 in 2 or more whorls, free or inner ones united; dioecious shrublets or woody climbers with small flowers ..... **MENISPERMACEAE**
5b Sepals 2–5 in 1 whorl, free or united:
6a Leaves compound or deeply divided:
7a Herbs ..... **RANUNCULACEAE**
7b Trees or shrubs ..... **CONNARACEAE**
6b Leaves simple, entire:
8a Leaves succulent; stamens 8–12 ..... **CRASSULACEAE**
8b Leaves herbaceous; stamens mostly more than 12:
9a Herbs ..... **RANUNCULACEAE**
9b Trees or shrubs, sometimes trailing ..... **ANNONACEAE**

GROUP 3 (*Placentation parietal; ovary superior; petals absent*)

1a Submerged aquatic herbs, fern-like owing to pinnately much-divided leaves; plants dioecious; flowers in elongated, pedunculate spikes; calyx absent ..... **HYDROSTACHYACEAE**
1b Terrestrial plants, not fern-like in habit:
2a Leaves pinnate or 2-foliolate; trees ..... **FABACEAE**
2b Leaves simple or digitately 3-foliolate, sometimes reduced to scales:
3a Flowers unisexual; plants dioecious; leaves simple; trees or shrubs:
4a Calyx absent; flowers in catkins; fruit a 2-valved capsule; seeds with a basal tuft of long, fine hairs ..... **SALICACEAE**
4b Calyx present; flowers solitary or in fascicles or short racemes; fruit a berry; seeds glabrous or covered with a woolly indumentum ..... **FLACOURTIACEAE**
3b Flowers bisexual:
5a Flowers with a fimbriate corona outside stamens; herbs or shrubs, often climbing with tendrils ..... **PASSIFLORACEAE**
5b Flowers without corona; tendrils absent:
6a Herbs or low shrublets; fruit a small capsule, either 1-locular with many ovules or 2-locular with 1 or 2 ovules per locule:
7a Capsule (silicula) with 2 1- or 2-seeded locules divided by a persistent, often membranous partition ..... **BRASSICACEAE**
7b Capsule 1-locular, often open at the top, with many ovules on 2–5 placentas ..... **RESEDACEAE**
6b Shrubs or trees; fruit, if a capsule, with more than 2 seeds per locule:
8a Ovary borne on a distinct stalk (gynophore) ..... **CAPPARACEAE**
8b Ovary sessile or subsessile ..... **FLACOURTIACEAE**

GROUP 4 (*Placentation parietal; ovary superior; petals free*)

1a Stamens 6, tetradynamous (inner 4 long, outer 2 short); sepals 4; petals 4 or fewer; leaves without stipules; herbs ..... **BRASSICACEAE**
1b Stamens not tetradynamous:
2a Gynoecium composed of 1 carpel, thus with only 1 placenta in ovary:
3a Flowers regular; petals 5 or fewer, sometimes 1; leaves simple or compound; trees or shrubs or herbs, sometimes climbing ..... **FABACEAE**
3b Flowers irregular:
4a Leaves 2-pinnate; stipules present; trees, shrubs or herbs, sometimes climbing; flowers in spikes or heads ..... **FABACEAE**
4b Leaves simple, 1-pinnate or 1–3-foliolate:
5a Leaves pinnate or 3-foliolate, the leaflets dotted with pellucid glands, at least at margin; trees or shrubs ..... **RUTACEAE**
5b Leaves simple or 1-foliolate, without pellucid glands:
6a Leaves toothed; stipules present; stamens as many as and opposite petals, united at base; herbs or small shrubs ..... **STERCULIACEAE**
6b Leaves entire; stipules absent; stamens more numerous than petals; trees or shrubs, sometimes climbing:
7a Sepals 5; petals 5; flowers in few-flowered racemes ..... **CONNARACEAE**
7b Sepals 3; petals 6; flowers solitary, axillary ..... **ANNONACEAE**
2b Gynoecium composed of 2 or more united carpels, thus with 2 or more placentas:
8a Leaves scale-like, dense; shrubs or small trees ..... **TAMARICACEAE**
8b Leaves not scale-like:
9a Leaves opposite or whorled, simple, not all radical; herbs:
10a Leaves dotted with pellucid glands; stamens more than twice as many as petals, often ± grouped into bundles; terrestrial plants ..... **CLUSIACEAE**
10b Leaves not gland-dotted; herbs, often hydrophytes:
11a Leaves bladdery, whorled; stamens as many as petals; free-floating aquatics ..... **DROSERACEAE**
11b Leaves small, opposite or whorled, not bladdery; stamens (4 or 5)6 ..... **FRANKENIACEAE**
9b Leaves alternate or all radical:
12a Flowers unisexual:
13a Stamens as many as petals:
14a Petals smaller than sepals; herbaceous or woody climbers with tendrils; leaves sometimes digitate or palmately lobed ..... **PASSIFLORACEAE**
14b Petals larger than sepals; trees or shrubs without tendrils; leaves simple, not lobed ..... **PITTOSPORACEAE**
13b Stamens twice as many as petals or more numerous; trees or shrubs without tendrils; petals free in all flowers ..... **FLACOURTIACEAE**
12b Flowers bisexual or plants sometimes polygamous:
15a Ovary borne on a distinct gynophore:
16a Flowers with a fimbriate or hairy corona outside stamens; styles 3–6; leaves simple; trees or shrubs, sometimes climbing ..... **PASSIFLORACEAE**
16b Flowers without a corona; style 1 or stigma sessile; leaves simple or digitate; trees, shrubs or herbs, sometimes climbing ..... **CAPPARACEAE**
15b Ovary sessile or subsessile:

17a Flowers ± irregular:
18a Leaves 2- or 3-pinnate; trees; flowers in axillary panicles; stamens 5, alternating with 5 staminodes..... **MORINGACEAE**
18b Leaves simple or digitate; herbs or sometimes shrubs or small trees:
19a Connective of anthers prolonged above thecae into an appendage; flowers mostly solitary; fruit a 3-valved capsule; leaves simple ..... **VIOLACEAE**
19b Connective of anthers not prolonged above thecae; flowers in terminal racemes or spikes:
20a Fruit a capsule dehiscing throughout its length by 2 valves; leaves simple or digitate..... **CAPPARACEAE**
20b Fruit a capsule gaping at apex; leaves simple, sometimes pinnately lobed or divided..... **RESEDACEAE**
17b Flowers regular:
21a Stamens 10, with filaments connate into a tube ± as long as the 10 petals ..... **CANELLACEAE**
21b Combination of characters not as above:
22a Stamens more numerous than petals, or as many and opposite them:
23a Flowers with a disc or a corona:
24a Climbers with tendrils; corona fimbriate, outside stamens ..... **PASSIFLORACEAE**
24b Shrubs or small trees; disc cupular, crowned by 10 gland-like processes; stamens arising from within disc..... **GREYIACEAE**
23b Flowers without a disc or a corona:
25a Prickly herbs; leaves often pinnately lobed; sepals 2 or 3, caducous; fruit a capsule dehiscing by 4–6 short valves at the top ..... **PAPAVERACEAE**
25b Trees or shrubs; leaves not pinnately lobed; fruit capsular or baccate, or of separate drupelets:
26a Gynoecium of 5–15 ± free, 1-ovulate carpels united by their completely fused styles; fruit of separate 1-seeded drupelets..... **OCHNACEAE**
26b Gynoecium with a 1-locular ovary with 1–many ovules; fruit a capsule or berry..... **FLACOURTIACEAE**
22b Stamens as many as and alternating with petals:
27a Styles 2–5, free or shortly united at base:
28a Leaves bearing many sticky, stipitate glands; insectivorous herbs ..... **DROSERACEAE**
28b Leaves without sticky glands; plants not insectivorous:
29a Flowers with a conspicuous, fimbriate or hairy corona outside stamens; herbs or shrubs, often climbing with tendrils ..... **PASSIFLORACEAE**
29b Flowers without a corona, or corona very small and inconspicuous; herbs without tendrils..... **TURNERACEAE**
27b Style 1:
30a Stamens variously united, connective of anthers prolonged above thecae into an appendage; leaves with stipules ..... **VIOLACEAE**
30b Stamens ± free, anthers without an appendage; leaves without stipules ..... **PITTOSPORACEAE**

GROUP 5 (*Placentation parietal; ovary superior; petals± united*)

1a Gynoecium consisting of 1 carpel, therefore with only 1 placenta in ovary; leaves with or without stipules:
2a Leaves simple or compound, with stipules or stipular spines; fruit a legume..... **FABACEAE**
2b Leaves simple; stipules absent; fruit a drupe containing a solitary U-shaped seed..... **MENISPERMACEAE**
1b Gynoecium consisting of 2 or more united carpels, therefore with 2 or more placentas in ovary; leaves without stipules:
3a Flowers irregular:
4a Leaves pinnately or ternately compound:
5a Leaves alternate; annual herbs with watery sap, sometimes with tendrils; outer petals often spurred or saccate at base..... **FUMARIACEAE**
5b Leaves opposite; trees with large pendulous, sausage-like fruits ..... **BIGNONIACEAE**
4b Leaves simple, sometimes reduced to scales; herbs:
6a Plants parasitic on roots; leaves reduced to scales; stamens 4 ..... **SCROPHULARIACEAE**
6b Plants not parasitic; leaves (or solitary leaf) well developed; stamens 2 ..... **GESNERIACEAE**
3b Flowers regular; stamens as many as corolla lobes or more numerous:
7a Leaves opposite:
8a Petals many; succulent herbs or shrubs with succulent leaves..... **MESEMBRYANTHEMACEAE**
8b Petals 4–6:
9a Shrubs or woody climbers with latex; fruit a large berry..... **APOCYNACEAE**
9b Herbs without latex; fruit a capsule, rarely berry-like ..... **GENTIANACEAE**
7b Leaves alternate or basal, sometimes small and scale-like:
10a Flowers unisexual; plants monoecious, herbaceous, subherbaceous or acaulescent herbs ..... **ACHARIACEAE**
10b Flowers bisexual:
11a Leaves small, scale-like; trees or shrubs, often halophytic ..... **TAMARICACEAE**
11b Leaves well developed:
12a Stamens more numerous than petals; petals twice as many as sepals; trees or shrubs, sometimes climbing.... **ANNONACEAE**

12b Stamens, petals and sepals all 5(6):
13a Herbs, aquatic or wetland; stamens arising on corolla tube ..... MENYANTHACEAE
13b Small trees or shrubs; stamens free from corolla tube ..... PITTOSPORACEAE

GROUP 6 (*Placentation parietal; ovary± inferior*)

1a Plants parasitic on roots of shrubs or trees, low, ± fleshy:
2a Perianth tubular, 3- or 4(5)-lobed, resembling a fungus ..... HYDNORACEAE
2b Perianth cup-shaped, 4–9-lobed, fused towards base ..... RAFFLESIACEAE
1b Plants not parasitic:
3a Petals absent: perianth members all ± similar:
4a Flowers irregular, usually with an S-shaped tube, medium-sized to large ..... ARISTOLOCHIACEAE
4b Flowers regular; tepals fused only towards base; fruit winged, horned or spiny ..... AIZOACEAE
3b Petals present: perianth differentiated into calyx and corolla:
5a Flowers unisexual; plants usually climbing with tendrils; leaves often palmately lobed or deeply divided..... CUCURBITACEAE
5b Flowers bisexual; plants without tendrils; leaves mostly entire, rarely with palmate venation:
6a Leaves absent or reduced to scales; succulent shrubs or shrublets, sometimes epiphytic ..... CACTACEAE
6b Leaves mostly well developed:
7a Succulent herbs or shrubs with succulent leaves; leaves mostly opposite; petals many..... MESEMBRYANTHEMACEAE
7b Plants not succulent; leaves opposite, or alternate; petals fewer than 10:
8a Leaves opposite or whorled, with interpetiolar stipules ..... RUBIACEAE
8b Leaves alternate or spirally imbricate and ± ericoid, rarely opposite but then without stipules; stipules if present, not interpetiolar:
9a Leaves small, sessile, ± ericoid, densely spirally imbricate ..... BRUNIACEAE
9b Leaves flat, broader than ericoid, alternate, rarely opposite, floating or submerged, if aquatic herbs:
10a Aquatic herbs with usually floating peltate leaves ..... NYMPHAEACEAE
10b Trees or shrubs ..... FLACOURTIACEAE

GROUP 7 (*Placentation axile, basal or apical; ovary superior; petals absent*)

1a Ovary with 2 or more ovules in each locule:
2a Plants aquatic; moss-like or liverwort-like in habit, growing on rocks; flowers small and inconspicuous; stamens 1 or 2; ovary with many ovules; fruit a capsule ..... PODOSTEMACEAE
2b Plants terrestrial, not moss-like or liverwort-like in habit:
3a Leaves reduced to scales forming toothed sheaths surrounding nodes of pine needle-like jointed branchlets; trees with unisexual flowers; male flowers in spikes, female flowers in heads; stamen 1; ovary 1-locular with 2 collateral ovules; style with 2 elongated branches..... *CASUARINACEAE
3b Leaves well developed, not reduced to scales:
4a Leaves opposite or whorled or all radical:
5a Flowers unisexual; trees, shrubs or shrublets:
6a Calyx absent; leaves toothed at apex, fan-like; flowers in catkin-like spikes; ovules many in each locule..... MYROTHAMNACEAE
6b Calyx present; leaves entire, not fan-like; flowers solitary or fasciculate in axils of leaves; ovules 2 in each locule:
7a Leaves with stipules; plants dioecious; stamens very many, spirally arranged on prolonged floral axis..... EUPHORBIACEAE
7b Leaves without stipules; plants monoecious; stamens 4–6 ..... BUXACEAE
5b Flowers bisexual; herbs:
8a Calyx spurred, spur adnate to pedicel; ovary beaked; leaves toothed or lobed ..... GERANIACEAE
8b Calyx not spurred; ovary without stout central axis; leaves entire:
9a Sepals fused below; stamens perigynous, inserted on calyx tube:
10a Style 1; fruit a capsule:
11a Ovary 1–5-locular, with many ovules in each locule ..... LYTHRACEAE
11b Ovary 4-locular, with 2 or 4 basal, erect, or 2 erect and 2 pendulous ovules in each locule..... PENAEACEAE
10b Styles 2–5, or if 1 then ovary 1-locular with few ovules; fruit a circumscissile capsule..... AIZOACEAE
9b Sepals free or almost so; stamens hypogynous:
12a Ovary 2–5-locular, with axile placentas ..... MOLLUGINACEAE
12b Ovary 1- or 4-locular with basal, free-central or apical placentation:
13a Ovary 1-locular with basal or free-central placentation ..... CARYOPHYLLACEAE
13b Ovary 4-locular, with 2 pendulous ovules in each locule, rarely 1 ovule aborted..... GEISSOLOMATACEAE
4b Leaves alternate, not all radical:
14a Leaves pinnate; trees, polygamous or with flowers all unisexual; ovary 2-locular with 2 ovules in each locule; fruit indehiscent ..... SAPINDACEAE

14b Leaves simple or digitate:
15a Ovary 1-locular; flowers in racemes or spikes:
16a Flowers mostly bisexual but plants sometimes polygamous:
17a Calyx scarious; fruit a ± circumscissile capsule; herbs ..... **AMARANTHACEAE**
17b Calyx of 4 thickish lobes; fruit a follicle; gland-dotted shrubs ..... **RUTACEAE**
16b Flowers unisexual; plants dioecious; calyx not scarious; fruit a drupe; trees or shrubs, sometimes climbing:
18a Leaves with stipules; calyx imbricate; stamens opposite sepals; styles 3, usually 2-lobed..... **EUPHORBIACEAE**
18b Leaves without stipules; calyx valvate; stamens alternating with sepals; style absent, stigma sessile and multiradiate ..... **ICACINACEAE**
15b Ovary 2- or more-locular:
19a Gynoecium composed of 3 or more loosely united carpels, in fruit separating into as many follicles (or fewer by abortion); trees or shrubs with flowers both bi- and unisexual; leaves simple or digitate; sepals valvate, united below; stamens united into a column..... **STERCULIACEAE**
19b Gynoecium composed of completely united carpels, in fruit forming a capsule, or indehiscent or finally separating into winged cocci:
20a Ovary borne on a distinct gynophore; flowers bisexual; shrubs with solitary, pedunculate, axillary flowers ..... **CAPPARACEAE**
20b Ovary sessile or subsessile:
21a Flowers bisexual; perianth segments sepaloid externally and petaloid internally ..... **AIZOACEAE**
21b Flowers mostly unisexual; plants occasionally polygamous:
22a Leaves with stipules; fruit a capsule, or indehiscent, or separating into 2 winged cocci; trees or shrubs or herbs ..... **EUPHORBIACEAE**
22b Leaves without stipules; fruit a septicidal capsule with 2 or more longitudinal, membranous wings; shrubs or trees ..... **SAPINDACEAE**

1b Ovary with 1 ovule in each locule:
23a Ovary 2- or more-locular:
24a Leaves pinnate or 3-foliolate:
25a Leaves pinnate, alternate; trees or shrubs ..... **SAPINDACEAE**
25b Leaves 3-foliolate, opposite; subshrubs ..... **ZYGOPHYLLACEAE**
24b Leaves simple, sometimes lobed or much divided or reduced to scales or stipular spines:
26a Flowers unisexual or plants polygamous:
27a Ovary 5-locular, carpels loosely united and becoming separate in fruit; calyx present, valvate, sepals united below; stamens 5–10, united into a column; leaves alternate; trees or shrubs ..... **STERCULIACEAE**
27b Ovary 2–4-locular, carpels completely united and not becoming separate in fruit:
28a Small aquatic herbs, sometimes terrestrial in damp situations; leaves opposite; perianth absent; fruit indehiscent, leathery ..... **CALLITRICHACEAE**
28b Trees, shrubs or herbs; leaves alternate or opposite, sometimes reduced to scales or stipular spines; calyx present or absent; fruit mostly dehiscent..... **EUPHORBIACEAE**
26b Flowers bisexual:
29a Sepals fused into a very short to long tube; stamens perigynous or hypogynous:
30a Stamens arising from upper portion of calyx tube, in 2 whorls; fruit a drupe; shrubs ..... **THYMELAEACEAE**
30b Stamens not arising on sepals, sometimes in groups; fruit a capsule or flat samara with membranous wings:
31a Trees with dentate leaves; fruit a flattened samara ..... **ULMACEAE**
31b Herbs, shrublets or shrubs with entire, often somewhat succulent leaves; fruit a capsule ..... **AIZOACEAE**
29b Sepals free; stamens hypogynous or almost so:
32a Leaves ± toothed or pinnately lobed or divided; style 1; fruit a flattened silicule or separating into 2 cocci; herbs ..... **BRASSICACEAE**
32b Leaves entire; styles 2 or more, free or united at base:
33a Ovary 7–10-locular; fruit a berry; flowers in spike-like racemes; herbs or shrublets ..... **PHYTOLACCACEAE**
33b Ovary 2–5-locular; fruit a loculicidal capsule or separating into 2 cocci, cocci sometimes winged along back; flowers in lax or dense cymes; herbs..... **MOLLUGINACEAE**
23b Ovary 1-locular:
34a Leaves absent or reduced to scales; flowers spicate:
35a Slender, twining, parasitic plants; flowers not immersed in rachis of spike; stamens 6–9, accompanied by staminodes; anthers opening by valves ..... **LAURACEAE**
35b Succulent, maritime herbs with articulated branches, not parasitic; flowers immersed in rachis of spike; stamens 1 or 2; anthers opening by longitudinal slits ..... **CHENOPODIACEAE**
34b Leaves present, well developed, not reduced to scales:
36a Leaves with stipules, stipules sometimes forming a sheath (ocrea) surrounding the stem:
37a Leaves 3- or 4-pinnate; calyx petaloid; fruit a stipitate achene borne on a slender pedicel; herbs..... **RANUNCULACEAE**
37b Leaves simple or digitate:
38a Ovule pendulous from apex or near apex of ovary; flowers unisexual or plants polygamous:
39a Flowers densely spicate or capitate, or crowded in or on an open or flat receptacle or inside a hollow, almost closed receptacle (fig), female flowers sometimes immersed in tissue of receptacle; calyx sometimes absent; trees, shrubs or herbs..... **MORACEAE**

39b Flowers solitary or fasciculate or in cymes or racemes or panicles; calyx sometimes reduced or absent in female flowers:

40a Annual herbs; leaves opposite or alternate, all or lower ones palmately divided; male flowers in elongated panicles; female flowers spicate, enclosed by bracts; fruit dry, indehiscent..... *CANNABACEAE

40b Trees or shrubs; leaves alternate:

41a Stamens as many as calyx segments, 4 or 5; style 2-branched with simple or divided stigmas; fruit a drupe; trees or shrubs..... ULMACEAE

41b Stamens more numerous than calyx segments; style unbranched, sometimes very short:

42a Flowers solitary or paired in axils of leaves; leaves 1–3-foliolate with small, narrow leaflets; heath-like shrubs..... ROSACEAE

42b Flowers in axillary racemes or panicles; leaves simple; trees..... EUPHORBIACEAE

38b Ovule arising from base or near base of ovary:

43a Leaves opposite, marked with cystoliths; flowers unisexual; herbs or shrubs..... URTICACEAE

43b Leaves alternate:

44a Calyx absent; flowers minute, in dense spikes; shrubs, sometimes climbing..... PIPERACEAE

44b Calyx present:

45a Styles 2 or 3, free or united below; stamens 4–8; fruit a small nut; stipules often forming an ocrea surrounding the stem; herbs or shrubs, sometimes climbing..... POLYGONACEAE

45b Style 1 or absent; stamens 5 or fewer:

46a Flowers bisexual; sepals united below, free portions alternating with lobes of an epicalyx; style arising laterally from near base of ovary; herbs with palmately lobed leaves..... ROSACEAE

46b Flowers unisexual; sepals free or united, without an epicalyx; style or sessile stigma terminal:

47a Leaves palmate or palmately lobed, without cystoliths; plants dioecious; male flowers crowded in branched spikes; female flowers in heads; trees..... MORACEAE

47b Leaves simple, sometimes pinnately lobed, often marked with cystoliths; plants monoecious or dioecious; flowers cymose, cymes often dense or head-like; herbs or shrubs or trees, sometimes climbing or epiphytic..... URTICACEAE

36b Leaves without stipules:

48a Submerged, aquatic herbs; leaves whorled, deeply and bifurcately divided with linear or filiform segments; flowers unisexual, solitary and sessile in axils of leaves..... CERATOPHYLLACEAE

48b Plants not aquatic; leaves alternate or opposite, undivided or sometimes pinnately divided:

49a Calyx absent; flowers in spikes:

50a Flowers unisexual; stamens 3–12; styles 2, free or shortly united below; leaves alternate; trees or shrubs... ..... MYRICACEAE

50b Flowers bisexual; stamens 2; style absent, stigma sessile; leaves alternate or opposite or whorled; herbs, sometimes trailing or climbing or epiphytic..... PIPERACEAE

49b Calyx present, at least in male flowers:

51a Stamens twice as many as calyx segments or more numerous:

52a Ovule erect from base of ovary; fruit enclosed in persistent, longitudinally 4-winged calyx tube; spiny shrubs with small, linear, often fasciculate leaves; plants polygamo-dioecious..... NYCTAGINACEAE

52b Ovule pendulous from apex of ovary; fruit not enclosed in winged calyx tube; plants not spiny:

53a Flowers bisexual; sepals united into an elongated tube; stamens arising on calyx tube; style elongated, slender; shrubs, often heath-like, or sometimes trees, with alternate or opposite leaves.... ..... THYMELAEACEAE

53b Flowers unisexual; plants dioecious; sepals shortly united at base; stamens not arising on calyx tube; style absent, stigma sessile; shrubs or trees with opposite or subopposite leaves..... MONIMIACEAE

51b Stamens fewer than twice as many as calyx segments, sometimes accompanied by staminodes:

54a Anthers opening by valves; calyx 6-lobed; stamens 6–9, accompanied by staminodes; trees ... LAURACEAE

54b Anthers opening by longitudinal slits; calyx with 3–5 segments or lobes:

55a Leaves opposite or subopposite:

56a Sepals ± petaloid, united into a tube constricted above ovary, lower portion of tube persistent and enclosing fruit and often glandular on outside; stamens not accompanied by staminodes; herbs or climbing shrubs..... NYCTAGINACEAE

56b Sepals dry and ± scarious, free or shortly united at base, not forming a tube constricted above ovary; stamens as many as and opposite calyx segments, often alternating with staminodes; herbs or shrubs..... AMARANTHACEAE

55b Leaves alternate:

57a Twining herbs; sepals (petals?) united below into a tube with 2 adnate bracteoles outside; flowers in axillary, pedunculate spikes..... BASELLACEAE

57b Plants not twining; sepals free or united, without adnate bracteoles:

58a Calyx with 2–4 valvate segments; trees or shrubs; flowers bisexual, in large, bracteate heads or in elongated spikes or racemes; stamens 4, free, opposite to and inserted on calyx segments; fruit a nut..... PROTEACEAE

58b Calyx with 3–5 imbricate segments or sometimes almost completely tubular with indistinct segments; herbs, shrubs or woody climbers:

59a Stamens fewer than calyx segments and mostly alternating with them; leaves small, linear; flowers in elongated, simple spikes..... PHYTOLACCACEAE

59b Stamens as many as or fewer than calyx segments and opposite them:

60a Disc of 4 or 5 fleshy lobes alternating with petals (may be taken for sepals as calyx is reduced to a rim); woody climbers ..... **OPILIACEAE**
60b Disc absent:
61a Sepals dry and ± scarious, free or shortly united at base; leaves entire ..... **AMARANTHACEAE**
61b Sepals herbaceous, free or ± united into a tube; leaves entire or ± toothed or pinnately divided ..... **CHENOPODIACEAE**

GROUP 8 (*Placentation axile, basal or apical; ovary superior; petals free*)

1a Ovary 1-locular, sometimes septate towards base:
2a Sepals 1 or 2, free, sometimes caducous:
3a Flowers unisexual; plants dioecious; sepals 1 or 2; petals 1–4; stamens united into a synandrium; leaf blades peltate or subpeltate; woody climbers ..... **MENISPERMACEAE**
3b Flowers bisexual or, if unisexual, then stamens free; sepals 2; petals 4 or 5; leaf blades not peltate; herbs:
4a Flowers irregular; ovary with 1 ovule; fruit a nut; leaves much divided ..... **FUMARIACEAE**
4b Flowers regular; ovary with many ovules; fruit a capsule; leaves entire, fleshy ..... **PORTULACACEAE**
2b Sepals (or calyx lobes) 3 or more, sometimes ± obsolete (calyx annular):
5a Leaves opposite or whorled, not all radical:
6a Leaves with stipules; herbs or shrublets ..... **CARYOPHYLLACEAE**
6b Leaves without stipules:
7a Petals and stamens perigynous, inserted on calyx tube:
8a Ovary with 1 apical, pendulous ovule; fruit indehiscent, dry or fleshy; often heath-like ..... **THYMELAEACEAE**
8b Ovary with many ovules on a basal or free-central placenta; stamens twice as many as petals or fewer; herbs, shrubs or trees ..... **LYTHRACEAE**
7b Petals and stamens hypogynous or only slightly perigynous, not inserted on calyx:
9a Herbs; ovary with 1–many ovules on a basal or free-central placenta; fruit a capsule ..... **CARYOPHYLLACEAE**
9b Trees or shrubs; ovary with 1 or 2 ovules; fruit drupaceous; stamens as many as and alternating with petals:
10a Filaments united at base into a tube or cup ..... **SALVADORACEAE**
10b Filaments ± free:
11a Ovule 1; styles 3, free or united at base; flowers unisexual; plants dioecious or polygamous ..... **ANACARDIACEAE**
11b Ovules 2–8; style 1 or stigma sessile; flowers bisexual:
12a Ovules 2, pendulous from apex of ovary ..... **ICACINACEAE**
12b Ovules 2–8, erect from base of ovary ..... **CELASTRACEAE**
5b Leaves alternate, sometimes all radical:
13a Leaves compound with 3 or more leaflets; trees or shrubs, sometimes climbing:
14a Leaves 2-pinnate; flowers bisexual; fruit winged, indehiscent ..... **FABACEAE**
14b Leaves 1-pinnate or 3-foliolate; flowers unisexual; plants polygamous or dioecious; fruit drupaceous ..... **ANACARDIACEAE**
13b Leaves simple or 1-foliolate:
15a Ovary with 1 ovule:
16a Flowers irregular; the inner 2 sepals larger than the others, the lowest (median) petal forming a keel, the upper 2 petals vestigial or absent; fruit long-winged, indehiscent; trees or shrubs, sometimes climbing ..... **POLYGALACEAE**
16b Flowers regular; fruit unwinged, but sometimes surrounded by persistent wing-like sepals:
17a Leaves with stipules; stamens as many as petals; herbs ..... **CARYOPHYLLACEAE**
17b Leaves without stipules:
18a Sepals united into an elongated tube; stamens mostly twice as many as petals, inserted on calyx tube; shrubs, sometimes heath-like ..... **THYMELAEACEAE**
18b Sepals free or almost so; calyx sometimes reduced to a rim:
19a Stamens united into a synandrium; leaf blade peltate or subpeltate; woody, dioecious climbers ..... **MENISPERMACEAE**
19b Stamens free or almost so; leaf blade not peltate:
20a Plants polygamous or dioecious; stamens 1–10; trees or shrubs ..... **ANACARDIACEAE**
20b Plants with bisexual flowers; stamens as many as and opposite petals; woody climbers ..... **OPILIACEAE**
15b Ovary with 2 or more ovules:
21a Leaves with stipules:
22a Stamens as many as and opposite petals, united at base; petals and stamens hypogynous; herbs or shrublets with stellate hairs ..... **STERCULIACEAE**
22b Stamens more numerous than petals, free; petals and stamens perigynous, inserted at mouth of calyx tube; trees or shrubs ..... **ROSACEAE**
21b Leaves without stipules; trees or shrubs:
23a Petals imbricate; stamens as many as and opposite petals; ovules on a free-central or basal placenta ..... **MYRSINACEAE**
23b Petals valvate:

24a Ovules 2 per locule, pendulous from apex of ovary; stamens as many as and alternating with petals..... **ICACINACEAE**

24b Ovules 2–5 per locule, pendulous from apex of a central placenta; stamens as many as and opposite petals, or up to twice as many, or reduced to 3 and accompanied by staminodes..... **OLACACEAE**

1b Ovary 2- or more-locular:

25a Stamens opposite and usually as many as petals:

26a Filaments ± united into a tube or cup, sometimes alternating with staminodes; calyx lobes valvate; herbs or shrubs, often with stellate hairs..... **STERCULIACEAE**

26b Filaments free, not alternating with staminodes:

27a Ovary with many ovules in each locule; fruit a loculicidal capsule; flowers in mainly terminal panicles; trees or shrubs:

28a Flowers usually unisexual by abortion; sepals and petals (4)5; disc well developed; capsule rounded..... **HETEROPYXIDACEAE**

28b Flowers bisexual; sepals, petals and stamens 6; disc absent; capsule dorsiventrally compressed..... **RHYNCHOCALYCACEAE**

27b Ovary with 1 or 2 ovules in each locule; fruit drupaceous or baccate:

29a Inflorescences leaf-opposed; herbaceous or woody plants, often climbing with tendrils; leaves simple (often lobed or divided) or digitate; ovules 2 in each locule; fruit a berry..... **VITACEAE**

29b Inflorescences axillary; trees or shrubs, often spiny, without tendrils; leaves simple, undivided; ovules 1 in each locule; fruit drupaceous..... **RHAMNACEAE**

25b Stamens, at least those of inner whorl, alternating with petals, as many as or more numerous or fewer than petals:

30a Leaves compound, with 2 or more leaflets:

31a Inflorescences bearing tendrils; climbing shrubs or herbs; leaves pinnate or 2-ternate..... **SAPINDACEAE**

31b Inflorescences without tendrils:

32a Herbs; stamens mostly twice as many as petals, sometimes as many as petals:

33a Style simple or stigma sessile; leaves mostly opposite, rarely alternate, 2- or 3-foliolate or pinnate..... **ZYGOPHYLLACEAE**

33b Styles 5, rarely fewer; leaves alternate or radical, digitately or pinnately compound..... **OXALIDACEAE**

32b Trees or shrubs, sometimes climbing:

34a Anthers 1-thecous; leaves digitate, 3–9-foliolate; stamens 10 or more, filaments united below..... **BOMBACACEAE**

34b Anthers 2-thecous; leaves pinnate or 2-pinnate or 2- or 3-foliolate:

35a Leaves opposite or subopposite:

36a Leaves imparipinnate or 3-foliolate:

37a Leaves dotted with pellucid glands at least at margin; fruit baccate or separating into 2–4 mericarps..... **RUTACEAE**

37b Leaves not gland-dotted; fruit a capsule..... **CUNONIACEAE**

36b Leaves paripinnate, leaflets without pellucid glands; fruit a compressed capsule with winged seeds..... **PTAEROXYLACEAE**

35b Leaves alternate:

38a Leaves with lateral or intrapetiolar stipules, imparipinnate; flowers ± irregular, in racemes; stamens 4 or 5..... **MELIANTHACEAE**

38b Leaves without stipules:

39a Filaments united into a tube; leaves pinnate or 2-pinnate..... **MELIACEAE**

39b Filaments free or only shortly united at base:

40a Leaflets dotted with pellucid glands; leaves pinnate or 3-foliolate..... **RUTACEAE**

40b Leaflets without pellucid glands:

41a Ovary with 2 or more ovules in each locule:

42a Ovules many in each locule; styles 5; fruit baccate; leaves pinnate..... **OXALIDACEAE**

42b Ovules 2 in each locule:

43a Fruit drupaceous; plants resinous..... **BURSERACEAE**

43b Fruit a capsule; carpels separating from a persistent central column; plants not resinous..... **PTAEROXYLACEAE**

41b Ovary with 1 ovule in each locule:

44a Styles 3–5, free and separated at base; plants polygamous or dioecious..... **ANACARDIACEAE**

44b Style or styles central or terminal, not separated at base:

45a Fruit with carpels separating from persistent central column; ovules on axile placenta; seeds winged..... **PTAEROXYLACEAE**

45b Fruit not as above; ovules erect or ascending or pendulous:

46a Ovules erect or ascending; leaves paripinnate or 2-pinnate or 2- or 3-foliolate..... **SAPINDACEAE**

46b Ovules pendulous:

47a Leaves 2-foliolate; branches armed with straight spines..... **BALANITACEAE**

47b Leaves imparipinnate, tufted at ends of branchlets; branches unarmed..... **KIRKIACEAE**

30b Leaves simple or 1-foliolate, sometimes deeply divided:

48a Perianth strongly irregular; sepals 3 or sometimes 5, the median one spurred; petals 3; stamens 5, anthers united around ovary; fruit an explosively dehiscent capsule; herbs..... **BALSAMINACEAE**

48b Perianth regular or slightly irregular:
49a Plants viscid; subshrubs; leaves with gland-tipped tentacles which trap insects ..... **RORIDULACEAE**
49b Plants not viscid:
50a Leaves opposite or whorled, not all radical:
51a Stamens more than twice as many as petals:
52a Leaves with stipules:
53a Trees or shrubs; stipules interpetiolar; petals fringed at apex; stamens 15–45, filaments not united into bundles ..... **RHIZOPHORACEAE**
53b Herbs; stipules not interpetiolar; petals not fringed; stamens 15, filaments united below into 5 bundles ..... **GERANIACEAE**
52b Leaves without stipules; sepals free; stamens and petals hypogynous; filaments irregularly arranged or ± united into bundles; styles 1–5 or absent; leaves usually dotted or streaked with pellucid or opaque glands; trees, shrubs or herbs ..... **CLUSIACEAE**
51b Stamens up to twice as many as petals:
54a Sepals united below into a tube:
55a Petals perigynous, inserted at mouth of calyx tube; ovary with many ovules in each locule:
56a Anthers opening by apical pores; connective often appendaged below anther; leaves with 3 or more parallel longitudinal nerves; herbs or shrubs ..... **MELASTOMATACEAE**
56b Anthers opening by longitudinal slits; connective unappendaged; leaves without parallel longitudinal nerves; herbs, shrubs or trees ..... **LYTHRACEAE**
55b Petals hypogynous, not arising on calyx tube; ovary with 1–3 ovules per locule:
57a Succulent annuals ..... **ZYGOPHYLLACEAE**
57b Trees or shrubs:
58a Stamens twice as many as petals; leaves with interpetiolar stipules; petals fringed at apex; plants not spiny ..... **RHIZOPHORACEAE**
58b Stamens as many as petals; leaves without stipules; petals not fringed; plants spiny..... **SALVADORACEAE**
54b Sepals free or almost so:
59a Ovary with 1 ovule in each fertile locule (sometimes 1 or 2 of the locules empty); stamens twice as many as petals; fruit winged; shrubs, often climbing ..... **MALPIGHIACEAE**
59b Ovary with 2 or more ovules in each locule:
60a Leaves lobed or deeply divided; ovary beaked; herbs or shrublets ..... **GERANIACEAE**
60b Leaves not lobed or divided; ovary without a stout central axis:
61a Styles 3–5:
62a Ovary with many ovules in each locule; sepals entire; leaves with stipules ..... **ELATINACEAE**
62b Ovary with 2 ovules in each locule; sepals toothed or lobed at apex; leaves without stipules ..... **LINACEAE**
61b Style 1:
63a Herbs or subshrubs; leaves succulent or glaucous ..... **ZYGOPHYLLACEAE**
63b Trees or shrubs, sometimes climbing:
64a Stamens as many as petals, alternating with petaloid staminodes; leaves dotted with pellucid glands ..... **RUTACEAE**
64b Stamens as many as or fewer than petals, not alternating with staminodes; leaves without translucent glands ..... **CELASTRACEAE**
50b Leaves alternate or fascicled, sometimes all radical:
65a Ovary with 1 ovule in each fertile locule (sometimes 1 or 2 of the locules empty):
66a Flowers unisexual or plants polygamous:
67a Leaves without stipules; latex absent; flowers in racemes or narrow panicles; fruit a drupe or capsule, sometimes bladdery or winged ..... **SAPINDACEAE**
67b Leaves with or without stipules; stipules sometimes spiny, especially in succulent species; milky to reddish latex often present; inflorescences basically cymose, sometimes flowers in cyathia (*Euphorbia*); fruit often a 3-lobed capsule dehiscing septicidally into 3 bivalved cocci, often leaving a ± persistent axis ..... **EUPHORBIACEAE**
66b Flowers bisexual:
68a Anthers 1-thecous; stamens numerous, filaments ± united into a tube around the style; sepals valvate, with or without an epicalyx; plants often with stellate hairs ..... **MALVACEAE**
68b Anthers 2-thecous:
69a Styles 2 or more, sometimes fused towards base:
70a Herbs or low subshrubs; fruit of 2 hemispherical mericarps, often with a rough surface..... **MOLLUGINACEAE**
70b Trees, shrubs or perennial scramblers; fruit a drupe or separating into 2 or 3 broadly winged mericarps:
71a Perennial scramblers, rarely shrubs with medifixed unicellular hairs; fruit separating into 2(3) broadly winged mericarps ..... **MALPIGHIACEAE**
71b Trees or shrubs, not scrambling, glabrous; fruit a drupe ..... **ERYTHROXYLACEAE**
69a Style 1:
72a Herbs or subshrubs; sepals and petals 4; stamens 6, tetradynamous (inner 4 long, outer 2 short); fruit an indehiscent, dehiscent or splitting capsule (silicula) ..... **BRASSICACEAE**

72b Trees, shrubs or rhizomatous subshrubs; sepals and petals usually 5; stamens mostly more than 6:
73a Petals and stamens perigynous, arising at mouth of calyx tube; ovary entire, fused on one side to calyx tube ..... **CHRYSOBALANACEAE**
73b Petals and stamens hypogynous; ovary deeply lobed, free from calyx ..... **OCHNACEAE**
65b Ovary with 2 or more ovules in each locule:
74a Stamens as many as or fewer than petals:
75a Ovary 5-locular:
76a Trees, monoecious; leaves usually paripinnate; ovules 6–12 per locule ..... **MELIACEAE**
76b Herbs or shrublets; ovules 2 per locule:
77a Petals imbricate; leaves lobed or divided; ovary and fruit beaked; herbs or shrublets..... **GERANIACEAE**
77b Petals contorted; leaves simple, entire; ovary and fruit without a stout central axis; herbs..... **LINACEAE**
75b Ovary 2–4-locular:
78a Petals 2-lobed or 2-fid; fruit a drupe; leaves entire ..... **DICHAPETALACEAE**
78b Petals not 2-lobed:
79a Flowers unisexual; styles 2 or 3, free or united at base, often lobed or branched..... **EUPHORBIACEAE**
79b Flowers bisexual; style 1 ..... **CELASTRACEAE**
74b Stamens more numerous than petals:
80a Leaves without stipules:
81a Filaments ± united into a tube ..... **MELIACEAE**
81b Filaments free:
82a Leaves dotted with translucent glands ..... **RUTACEAE**
82b Leaves without translucent glands:
83a Trees or shrubs, secreting resin ..... **BURSERACEAE**
83b Herbs with tubers or a woody rootstock ..... **OXALIDACEAE**
80b Leaves with stipules:
84a Sepals imbricate; plants without stellate hairs; ovary 5-locular with 2 ovules in each locule:
85a Petals imbricate; ovary beaked, with a 5-branched style; herbs or shrublets ..... **GERANIACEAE**
85b Petals contorted; ovary without a stout central axis, with 5 free styles; trees or shrubs, sometimes climbing ..... **LINACEAE**
84b Sepals (or calyx lobes) valvate; plants often with stellate hairs:
86a Filaments free or almost so; trees, shrubs or herbs ..... **TILIACEAE**
86b Filaments ± united into a tube or into groups of 2 or 3:
87a Anthers 2-thecous; trees or shrubs ..... **STERCULIACEAE**
87b Anthers 1-thecous; herbs, shrubs or sometimes trees..... **MALVACEAE**

GROUP 9 (*Placentation axile, basal or apical; ovary superior; petals ± united*)

1a Ovary 1-locular, sometimes septate towards base:
2a Flowers unisexual; plants dioecious; male flowers with united petals, female flowers with 1–4 free petals; stamens united into a synandrium; leaf blades peltate or subpeltate; woody climbers ..... **MENISPERMACEAE**
2b Flowers bisexual; stamens free or with united filaments:
3a Ovary with 1 ovule:
4a Flowers irregular, papilionaceous, lowermost 2 petals united and forming a keel; stamens 10, diadelphous: uppermost 1 free, other 9 with united filaments; herbs..... **FABACEAE**
4b Flowers regular; stamens not diadelphous:
5a Sepals 2; petals united only near base; ± succulent twining herbs or stout shrubs:
6a Leaves alternate; perennials with twining stems..... **BASELLACEAE**
6b Leaves opposite; succulent shrubs with stout, sometimes waxy branches..... **PORTULACACEAE**
5b Sepals more than 2:
7a Stamens inserted on elongated calyx tube, usually twice as many as calyx lobes; corolla ring-like, inserted at mouth of calyx tube; ovule pendulous from apex of ovary; shrubs, sometimes climbing ... **THYMELAEACEAE**
7b Stamens not inserted on calyx, as many as calyx lobes; corolla 4- or 5-lobed, not ring-like; ovule arising from base of ovary:
8a Leaves alternate; stamens opposite petals; calyx covered with stalked glands; herbs or shrubs, sometimes climbing..... **PLUMBAGINACEAE**
8b Leaves opposite; stamens alternating with petals; calyx without stalked glands; shrubs or trees..... **SALVADORACEAE**
3b Ovary with 2 or more ovules:
9a Stamens fewer than petals; flowers ± irregular; herbs, often aquatic:
10a Stamens 2; corolla strongly irregular, tube spurred; leaves undivided or much divided and often bearing insectivorous bladders ..... **LENTIBULARIACEAE**

10b Stamens 4; corolla only slightly irregular, tube not spurred; leaves undivided, without bladders..... **SCROPHULARIACEAE**

9b Stamens as many as petals; flowers regular or almost so:

11a Stamens opposite petals:

12a Trees, shrubs or lianes; fruit indehiscent, usually 1-seeded; leaves alternate..... **MYRSINACEAE**

12b Herbs; fruit a many-seeded circumscissile or 5-valved capsule, or sometimes 1-seeded and indehiscent; leaves opposite or alternate..... **PRIMULACEAE**

11b Stamens alternating with petals; trees or shrubs:

13a Leaves densely crowded or in whorls or pseudowhorls, ± ericoid to coarsely so..... **STILBACEAE**

13b Leaves opposite or alternate, flat or succulent:

14a Leaves opposite:

15a Shrubs or woody climbers with milky sap..... **APOCYNACEAE**

15b Trees or shrubs, sometimes mangroves, sometimes leaves with 5(7) major veins from near the base:

16a Leaves with 1 major vein from the base; mangroves..... **AVICENNIACEAE**

16b Leaves with 5(7) major veins from near the base; savanna trees..... **STRYCHNACEAE**

14b Leaves alternate; stamens 5 or 10 or more; ovules 2 or 10 or more:

17a Trees, shrubs or lianas; sepals (3)4 or 5; stamens 5; fruit a drupe..... **ICACINACEAE**

17b Subshrubs or perennial herbs, often with fleshy leaves: sepals 2; stamens 10 or more; fruit a chartaceous capsule..... **PORTULACACEAE**

1b Ovary 2- or more-locular:

18a Petals 10 or more:

19a Styles/stigmas 5; fruit a 5-valved capsule; herbs with fleshy leaves..... **MESEMBRYANTHEMACEAE**

19b Style 1; fruit a berry; trees or shrubs, sometimes climbing:

20a Petals in 2 or 3 series, imbricate; stamens twice as many as inner petals, or as many as and opposite inner petals and alternating with staminodes; ovary with 1 ovule in each locule; leaves alternate..... **SAPOTACEAE**

20b Petals in 1 whorl, imbricate; stamens 2; ovary with 4 or 5 ovules in each locule..... **OLEACEAE**

18b Petals fewer than 10:

21a Stamens more numerous than petals:

22a Leaves with stipules, often digitate or palmately lobed; flowers unisexual; trees, shrubs or herbs..... **EUPHORBIACEAE**

22b Leaves without stipules:

23a Flowers irregular, lowest (median) petal forming a keel; filaments united into a sheath split on upper side; ovary 2-locular with 1 ovule in each locule; herbs or shrubs..... **POLYGALACEAE**

23b Flowers regular; filaments not united into a sheath; trees or shrubs:

24a Ovary with 1 or 2 ovules in each locule; fruit indehiscent, baccate; flowers bisexual or unisexual.. **EBENACEAE**

24b Ovary with several or many ovules in each locule; fruit a loculicidal capsule; flowers bisexual; anthers opening by apical pores or by longitudinal slits; style unbranched; plants often heath-like..... **ERICACEAE**

21b Stamens as many as or fewer than petals:

25a Stamens fewer than petals: 2–4:

26a Ovary with more than 4 ovules in each locule; flowers mostly irregular:

27a Leaves pinnate, opposite or ternate; stamens 4; fruit a loculicidal capsule with winged seeds; trees or shrubs, sometimes climbing..... **BIGNONIACEAE**

27b Leaves simple, sometimes deeply divided or reduced to scales:

28a Ovary completely or incompletely 4-chambered, each of 2 original locules becoming divided into 2 by a false septum; stamens 4; herbs or sometimes shrubs, with mucilaginous glands..... **PEDALIACEAE**

28b Ovary 2-locular, locules not becoming divided by false septa:

29a Ovules arranged in more than 2 series on each placenta; stamens 4 or 2; fruit a capsule or sometimes a berry, seeds not borne on hardened hook-like funicles; leaves alternate or opposite or whorled, sometimes reduced to scales; herbs or shrubs or sometimes trees..... **SCROPHULARIACEAE**

29b Ovules arranged in 1 or 2 series on each placenta:

30a Fruit a club-shaped to ellipsoidal, loculicidally, often explosively dehiscent capsule, with seeds mostly borne on hard, hygroscopic, hook-like funicles; leaves opposite, mostly entire; herbs, shrubs or small trees..... **ACANTHACEAE**

30b Fruit indehiscent to tardily dehiscent, sometimes a drupe; seeds not borne on hardened hook-like funicles; leaves ± sinuate or lobed to unlobed:

31a Fruit a drupe; flowers regular, small, white, bell-shaped, solitary or in axillary clusters; leaves gland-dotted, entire or toothed; evergreen shrubs or trees..... ***MYOPORACEAE**

31b Fruit indehiscent or tardily dehiscent, armed with horns bearing recurved spines; flowers irregular, medium-sized, variously coloured, adaxially often gibbous, usually solitary, axillary; herbs rarely shrubs or small trees..... **PEDALIACEAE**

26b Ovary with 1–4 ovules in each locule:

32a Stamens 3; peduncles adnate to petioles of subtending leaves; trees or shrubs with alternate leaves..... **DICHAPETALACEAE**

32b Stamens 4 or 2; peduncles not adnate to leaves:

33a Perianth regular:

34a Stamens 2; leaves opposite or sometimes ternate or alternate; trees or shrubs, sometimes climbing..... **OLEACEAE**

34b Stamens 4; leaves alternate, simple, gland-dotted; evergreen shrubs or trees ..... ***MYOPORACEAE**

33b Perianth irregular:

35a Ovary ± deeply 4-lobed, style gynobasic; fruit separating into 4 nutlets (or fewer by abortion); leaves simple, opposite or whorled or sometimes alternate; herbs or shrubs, often aromatic ..... **LAMIACEAE**

35b Ovary not deeply 4-lobed, style not gynobasic:

36a Fruit a capsule, loculicidally dehiscent or sometimes failing to dehisce; seeds often borne on hardened, hook-like funicles; ovary 2-locular with 2–4 ovules in each locule; herbs or shrubs with opposite, simple leaves ..... **ACANTHACEAE**

36b Fruit separating into 2 or more pyrenes or cocci, or a capsule, but then seeds not borne on hardened hook-like funicles:

37a Flowers solitary, axillary; fruit indehiscent, armed with 2 or 4 spines, or longitudinally 4-winged; stamens 4; leaves opposite or subopposite, often toothed or pinnately lobed; herbs with mucilaginous glands ..... **PEDALIACEAE**

37b Flowers grouped in inflorescences; fruit without spines or wings:

38a Anthers 1-thecous; leaves mostly alternate, simple, narrow; ovary 2-locular with 1 apical, pendulous ovule in each locule; herbs or shrubs ..... **SCROPHULARIACEAE**

38b Anthers 2-thecous; sometimes confluent; leaves opposite or whorled:

39a Herbs, shrubs or trees; leaves simple or digitate; ovary 2–8-locular with 1 basal or axile ovule in each locule ..... **VERBENACEAE**

39b Ericoid shrubs or shrublets; leaves simple, whorled on older branches; ovary 1- or 2-locular; sometimes septum incomplete, 2-ovuled; ovules erect, anatropous ..... **STILBACEAE**

25b Stamens as many as petals: 4 or more:

40a Leaves absent or reduced to scales:

41a Slender, twining, parasitic plants; ovary with 2 ovules in each locule; fruit a capsule; corolla with or without infrastaminal scales (*Cuscuta*) ..... **CONVOLVULACEAE**

41b Shrubs or succulent plants, not parasitic; ovary with many ovules in each locule; fruit formed of 2 separate follicular carpels (or 1 by abortion); flowers with corona ..... **APOCYNACEAE**

40b Leaves present, well developed:

42a Stamens opposite petals, sometimes with staminodes; trees or shrubs with alternate leaves ..... **SAPOTACEAE**

42b Stamens alternating with petals, sometimes partly connate:

43a Leaves opposite or whorled, sometimes in opposite or subopposite fascicles on small cushions, not all radical:

44a Stamens hypogynous, not arising on corolla; anthers opening by apical slits; heath-like shrubs..... **ERICACEAE**

44b Stamens arising on corolla tube or variously joined with gynoecium:

45a Petals imbricate:

46a Ovary with 1 or 2 ovules in each locule; fruit drupaceous or separating into pyrenes or nutlets:

47a Petals and stamens 5; herbs, often with bulbous-based hairs ..... **BORAGINACEAE**

47b Petals and stamens 4; herbs, shrubs or trees ..... **VERBENACEAE**

46b Ovary with several to many ovules in each locule; fruit a septicidal capsule, sometimes a berry:

48a Petals and stamens 5 or more; leaves pinnately compound, or simple and then rigid spiny shrubs with solitary or paired flowers ..... **BIGNONIACEAE**

48b Petals and stamens 4; herbs, subshrubs, shrubs or trees, not spiny, and if shrubs, flowers not solitary or paired:

49a Herbs; flowers solitary or paired in leaf axils ..... **SCROPHULARIACEAE**

49b Trees, shrubs or subshrubs; flowers in cymes, racemes or panicles ..... **BUDDLEJACEAE**

45b Petals contorted or valvate:

50a Petals valvate; leaves usually with 3 major veins from base; fruit a berry, often large, globose and with a woody rind ..... **STRYCHNACEAE**

50b Petals contorted:

51a Herbs with septicidal capsules or rarely trees with berries ..... **GENTIANACEAE**

51b Herbs, often succulent, shrubs or trees, often with milky latex; flowers often with corona; fruit mostly a pair of follicular mericarps ..... **APOCYNACEAE**

43b Leaves (at least lower ones) alternate, sometimes all radical:

52a Leaves all radical; flowers small, in pedunculate spikes or heads; fruit a circumscissile capsule; herbs... **PLANTAGINACEAE**

52b Leaves not all radical:

53a Ovary with more than 2 ovules in each locule:

54a Petals contorted; fruit formed of 2 follicular mericarps; shrubs or trees ..... **APOCYNACEAE**

54b Petals not contorted; fruit a capsule or berry:

55a Styles 2 or 3; petals imbricate; fruit a capsule; herbs ..... **HYDROPHYLLACEAE**

55b Style 1:

56a Petals plicate or valvate; herbs, shrubs or trees ..... **SOLANACEAE**

56b Petals imbricate:

57a Fruit a capsule with winged seeds; leaves simple or 3-foliolate; spiny shrubs..... **BIGNONIACEAE**

57b Fruit a berry or capsule, seeds unwinged; leaves simple; herbs or spiny shrubs..... **SOLANACEAE**

53b Ovary with 1 or 2 ovules in each locule:

58a Filaments united into a sheath split on upper side; flowers irregular, lowest (median) corolla lobe forming a keel; fruit drupaceous; shrubs or trees ..... **POLYGALACEAE**

58b Filaments not united into a sheath:

59a Corolla tube split down front, with 4 lobes; anthers 1-thecous; ovary 2-locular with 1 apical, pendulous ovule in each locule; herbs or shrublets with spicate flowers ...**SCROPHULARIACEAE**

59b Corolla tube not split; anthers 2-thecous:

60a Style absent; stigma sessile; flowers unisexual; fruit a globose berry ..... **AQUIFOLIACEAE**

60b Style(s) present, terminal or gynobasic; flowers bisexual; fruit a schizocarp or drupaceous or a capsule, rarely indehiscent:

61a Fruit a schizocarp of 4 nutlets or drupaceous with 4, 1-seeded stones, rarely a 2-locular capsule with 1 seed per locule (*Wellstedia*); petals imbricate or contorted in bud..... **BORAGINACEAE**

61b Fruit a capsule or indehiscent; petals convolute, folded and valvate in bud; plants often twining or trailing ..... **CONVOLVULACEAE**

GROUP 10 (*Placentation axile, basal or apical; ovary inferior; petals absent*)

1a Parasitic plants: either low, ± fleshy, ± leafless and growing on roots of woody plants or shrublets growing on trees or shrubs:

2a Shrublets growing on other trees or shrubs ..... **VISCACEAE**

2b Low, ± fleshy, ± leafless root parasites:

3a Flowers unisexual, in many-flowered inflorescences; leaves scale-like; ovule 1 ..... **BALANOPHORACEAE**

3b Flowers usually bisexual, solitary, with a tubular 3- or 4(5)-lobed perianth resembling a fungus ..... **HYDNORACEAE**

1b Plants not parasitic:

4a Ovary 2- or more-locular:

5a Flowers unisexual; leaves with stipules:

6a Male flowers in catkins; female flowers solitary ..... ***FAGACEAE**

6b Flowers in heads, cymes or panicles:

7a Flowers in heads; stamens as many as sepals; ovary with 1 ovule in each locule; trees or shrubs with entire leaves ..... **HAMAMELIDACEAE**

7b Flowers in cymes or panicles; stamens many; ovary with very many ovules in each locule; sepals petaloid; herbs, sometimes epiphytic, with alternate, often unequal-sided leaves ..... **BEGONIACEAE**

5b Flowers bisexual; leaves without stipules:

8a Leaves opposite; flowers solitary and subsessile in axils of leaves; herbs ..... **ONAGRACEAE**

8b Leaves alternate:

9a Trees (mangroves); stamens and staminodes very many, the outer series of staminodes fused and resembling a corolla ..... **LECYTHIDACEAE**

9b Herbs or shrubs; stamens, if many, without fused staminodes:

10a Perianth fused into an S-shaped to ± straight tube; usually twining or scrambling herbs or shrubs; fruit a capsule ..... ***ARISTOLOCHIACEAE**

10b Perianth members free or fused only in the lower half; fruit a nut, often winged or spiny ..... **AIZOACEAE**

4b Ovary 1-locular:

11a Ovules 2 or more in the ovary:

12a Stamens twice as many as calyx lobes:

13a Trees, shrubs or scramblers; flowers in racemes, spikes or heads; fruit indehiscent, often with 2–5 longitudinal wings ..... **COMBRETACEAE**

13b Shrubs or shrublets; flowers usually in threes surrounded by an involucre, or in miniature cone-like aggregations; fruit fused to perianth base and fused with adjacent fruits to form a syncarp ..... **GRUBBIACEAE**

12b Stamens as many as calyx lobes:

14a Ovules 2–4, pendulous from a free-central placenta; style 1 with an entire or divided stigma; flowers solitary or in cymes or racemes, bisexual or unisexual; herbs or shrubs, often parasitic on roots and sometimes with reduced leaves ..... **SANTALACEAE**

14b Ovules 4, pendulous from apex of ovary; styles 4; flowers clustered in axils of leaves, unisexual or plants polygamous; herbs, not parasitic ..... **HALORAGACEAE**

11b Ovule 1 in the ovary:

15a Herbs with basal, long-petiolate, toothed, kidney-shaped leaves; flowers small, paniculate-spicate...**GUNNERACEAE**

15b Trees, shrubs or subshrubs:

16a Leaves opposite; perianth tube deeply urn-shaped; anthers opening by 2 valves ..... **LAURACEAE**

16b Leaves mostly alternate:

17a Flowers unisexual, small, enclosed in a syconium or 'fig', or implanted on a flat to top-shaped receptacle, in globose heads or catkins; often with milky or watery latex ..... **MORACEAE**

17b Flowers bisexual or unisexual, cymose in axils of upper leaves; latex absent; fruit a bony nut with long wings ..... **HERNANDIACEAE**

GROUP 11 (*Placentation axile, basal or apical; ovary inferior; petals free*)

1a Parasitic shrubs growing on other shrubs or trees; ovules scarcely distinguishable from surrounding tissue of ovary; calyx truncate or obsolete; stamens as many as and opposite petals and arising on them; leaves simple, entire, opposite or alternate, sometimes reduced to scales ..... **LORANTHACEAE**

1b Plants not parasitic; ovule or ovules clearly distinguishable within ovary:

2a Ovary 1-locular:

3a Trees or shrubs, sometimes climbing; style 1, unbranched:

4a Leaves alternate or scattered, ± ericoid; stamens 4 or 5:

5a Sepals, petals and stamens 4; flowers solitary, axillary ..... **CELASTRACEAE**

5b Sepals, petals and stamens 5; flowers in dense heads, panicles or spikes, rarely solitary ..... **BRUNIACEAE**

4b Leaves opposite, rarely alternate but then stamens more than 5, flat, sometimes with 3(5) main veins from base:

6a Leaves with 3(5) main veins from base; young branches usually 4-angled; fruit a ± globose berry; ovules 2–12 on central placenta ..... **MELASTOMATACEAE**

6b Leaves with 1 main vein from base; fruit usually indehiscent, dry or sometimes fleshy, often variously winged or ridged; ovules usually 2, pendulous ..... **COMBRETACEAE**

3b Herbs or subshrubs; styles or style branches 2–6:

7a Ovules many on basal placenta; sepals 2, often deciduous; fruit a circumscissile capsule ..... **PORTULACACEAE**

7b Ovule or ovules pendulous from apex of ovary or on pendulous, apical placentas; sepals or calyx lobes 2–5; fruit not circumscissile:

8a Ovules many on pendulous placentas; fruit a capsule dehiscing at apex; leaves opposite; flowers bisexual, in axillary pairs; petals and stamens 5 ..... **VAHLIACEAE**

8b Ovules 1–4, pendulous from apex of ovary; fruit indehiscent; leaves alternate or opposite, sometimes all radical; flowers bisexual or unisexual, paniculate-spicate or in axillary clusters:

9a Leaves small, sessile; flowers in axillary fascicles ..... **HALORAGACEAE**

9b Leaves large, on long petioles; flowers in terminal heads or compound spikes ..... **GUNNERACEAE**

2b Ovary 2- or more-locular:

10a Ovule 1 in each locule, rarely 2 in Loasaceae:

11a Stamens many; scabrous shrubs or shrublets with barbed bristles; fruit woody, ribbed, crowned with persistent calyx ..... **LOASACEAE**

11b Stamens as many or twice as many as petals:

12a Stamens twice as many as petals:

13a Trees or shrubs, mostly mangroves ..... **RHIZOPHORACEAE**

13b Herbs or subshrubs:

14a Petals 5; stamens 10; ovary 5–10-locular; in dry habitats ..... **NEURADACEAE**

14b Petals 2–4; stamens 4–8; ovary 1–4-locular:

15a Flowers small to minute, usually unisexual; aquatics or marsh plants ..... **HALORAGACEAE**

15b Flowers conspicuous with 4 white, usually sharply clawed petals ..... **ONAGRACEAE**

12b Stamens as many as petals:

16a Stamens opposite petals; shrubs, often climbing with tendrils; fruit often separating into cocci, sometimes winged ..... **RHAMNACEAE**

16b Stamens alternating with petals; plants without tendrils:

17a Flowers solitary in axils of leaves; floating, aquatic herbs; leaves alternate, rosulate, with ± inflated petiole; fruit large, indehiscent, with hard endocarp and armed with 2 or 4 horns ..... **TRAPACEAE**

17b Flowers grouped in inflorescences; plants not aquatic:

18a Fruit separating into 2 cocci; herbs, sometimes arborescent; flowers in simple or compound umbels, sometimes capitate; leaves often much divided or compound ..... **APIACEAE**

18b Fruit drupaceous or capsular, not separating into cocci; trees or shrubs:

19a Leaves pinnate or digitate or palmately divided; flowers in umbels or racemes or spikes; fruit drupaceous ..... **ARALIACEAE**

19b Leaves simple, undivided:

20a Petals and stamens 4; fruit a drupe; leaves opposite, entire or toothed; flowers bisexual or unisexual, in panicles or umbel-like cymes ..... **CORNACEAE**

20b Petals and stamens 5; fruit a capsule:

21a Leaves small, often ericoid, rarely longer than 20 mm, sessile to shortly petiolate; shrubs or shrublets ..... **BRUNIACEAE**

21b Leaves mostly longer than 25 mm, petiolate; trees or shrubs ..... **HAMAMELIDACEAE**

10b Ovules 2 or more in each locule:

22a Leaves usually small, often ericoid, densely spirally imbricate ..... **BRUNIACEAE**

22b Leaves alternate or opposite:

23a Leaves alternate:

24a Leaves with stipules, often unequal-sided; flowers unisexual; plants monoecious; stamens many; ovules very many in each locule; herbs, sometimes epiphytic ..... **BEGONIACEAE**

24b Leaves without stipules:

25a Style absent; stigmas as many as locules, subulate to filiform; leaves ± succulent ..... **MESEMBRYANTHEMACEAE**

25b Styles 1 or 2:

26a Styles 2; flowers unisexual or both bisexual and unisexual on same plant, in axillary panicles; stamens as many as petals; ovary 2-locular; shrubs ..... **ESCALLONIACEAE**
26b Style 1, with an entire or lobed stigma; flowers bisexual or sometimes both bisexual and unisexual on same plant:
27a Fruit a drupe; petals 2-fid or 2-lobed; leaves entire ..... **DICHAPETALACEAE**
27b Fruit a capsule:
28a Stamens as many or twice as many as petals:
29a Herbs or shrubs, sometimes aquatic; flowers bisexual ..... **ONAGRACEAE**
29b Shrub or shrublets, dioecious; flowers small, male corymbose, female solitary ..... **MONTINIACEAE**
28b Stamens many, more than twice as many as petals; fruit a berry or drupe:
30a Flowers solitary or paired in axils of leaves; ovary 2-locular; leaves gland-dotted; shrublets..... **MYRTACEAE**
30b Flowers in terminal racemes; ovary 4-locular; leaves not gland-dotted; mangroves..... **LECYTHIDACEAE**
23b Leaves opposite:
31a Leaves fleshy and succulent ..... **MESEMBRYANTHEMACEAE**
31b Leaves not succulent:
32a Stamens as many as petals; petals alternating with incurved scales; trees or shrubs ..... **OLINIACEAE**
32b Stamens twice as many as petals or more numerous; petals not alternating with scales:
33a Stamens many, more than twice as many as petals; trees or shrubs with gland-dotted leaves; stipules absent or very small ..... **MYRTACEAE**
33b Stamens twice as many as petals, if more, then interpetiolar stipules present or a scar line if they have fallen:
34a Leaves with interpetiolar stipules; ovules 2 in each locule; viviparous, mangroves, or forest trees or shrubs ..... **RHIZOPHORACEAE**
34b Leaves without stipules or stipules much reduced; ovules many in each locule; plants not viviparous:
35a Anthers opening by an apical pore; connective often appendaged below anther; leaves with 3 or more parallel, longitudinal nerves; seeds without tuft of hairs; herbs or shrubs or small trees..... **MELASTOMATACEAE**
35b Anthers opening by longitudinal slits; connective unappendaged; leaves without parallel, longitudinal nerves; seeds often with an apical tuft of hairs; herbs ..... **ONAGRACEAE**

GROUP 12 (*Placentation axile, basal or apical; ovary inferior; petals ± united*)

1a Parasitic shrubs growing on other shrubs or trees; ovules scarcely distinguishable from surrounding tissue of ovary; calyx truncate or shortly lobed; stamens as many as and opposite corolla lobes and arising on them; leaves simple, entire, opposite or alternate, sometimes ternate ..... **LORANTHACEAE**
1b Plants not parasitic; ovule or ovules clearly distinguishable within ovary:
2a Ovary 1-locular:
3a Ovules pendulous; ericoid shrubs or shrublets ..... **BRUNIACEAE**
3b Ovules not pendulous:
4a Ovule 1; flowers regular or irregular, in involucrate heads; fruit indehiscent, often crowned by persistent calyx forming a pappus of bristles or scales:
5a Anthers united into tube surrounding style; ovule erect from base of ovary; herbs, shrubs or trees; corolla of outer (ray) flowers often differing from that of inner flowers ..... **ASTERACEAE**
5b Anthers free; ovule pendulous from apex of ovary; herbs with opposite leaves ..... **DIPSACACEAE**
4b Ovules many on basal placenta; flowers regular, not in involucrate heads:
6a Calyx composed of 2 often deciduous sepals; fruit a circumscissile capsule; stamens as many as and alternating with corolla lobes or more numerous; herbs ..... **PORTULACACEAE**
6b Calyx 4- or 5-lobed; fruit not circumscissile; stamens as many as and opposite corolla lobes:
7a Trees or shrubs; flowers in axillary panicles or racemes; fruit indehiscent, dry or fleshy ..... **MYRSINACEAE**
7b Herbs; flowers in terminal racemes; fruit a 5-valved capsule ..... **PRIMULACEAE**
2b Ovary 2- or more-locular (sometimes 3-locular with 1 fertile locule and 2 empty locules):
8a Petals united into a deciduous mass (calyptra); stamens very many; trees or shrubs with gland-dotted leaves..... **MYRTACEAE**
8b Petals more or less united into a tube, not into a deciduous mass; stamens not more than twice as many as corolla lobes:
9a Ovary 3-locular with 2 empty locules, fertile locule with 1 apical, pendulous ovule; stamens 3; fruit indehiscent, often crowned by persistent calyx forming feathery pappus; herbs with opposite leaves ..... **VALERIANACEAE**
9b Ovary 2- or more-locular, usually without empty locules:
10a Trailing or climbing herbs or shrubs often with tendrils; flowers unisexual; stamens 3–5, anthers sometimes curved or flexuous or folded; leaves often palmately or pedately lobed or deeply divided ..... **CUCURBITACEAE**
10b Plants without tendrils; flowers bisexual or sometimes unisexual:
11a Leaves opposite or whorled, with interpetiolar or intrapetiolar (sometimes leaf-like) stipules and entire margin; trees, shrubs or herbs, sometimes climbing ..... **RUBIACEAE**
11b Leaves alternate or opposite, or spirally imbricate, without stipules, sometimes reduced to scales:
12a Stamens indefinite; leaves fleshy ..... **MESEMBRYANTHEMACEAE**
12b Stamens definite; leaves rarely succulent:

13a Stamens twice as many as corolla lobes; anthers opening by apical pores; flowers in axillary racemes; trees or shrubs with alternate leaves ..... **ERICACEAE**
13b Stamens as many as corolla lobes; anthers opening by longitudinal slits:
14a Fruit a drupe:
15a Ovary with 1 ovule in each locule; flowers irregular, corolla tube split down back; maritime shrubs or undershrubs ..... **GOODENIACEAE**
15b Ovary with 2 or more ovules in each locule; flowers ± regular; petals bifid or bilobed..... **DICHAPETALACEAE**
14b Fruit a capsule:
16a Ovules (1)2(–10) in each locule, pendulous; ericoid shrublets or shrubs ..... **BRUNIACEAE**
16b Ovules many in each locule:
17a Corolla lobes imbricate; capsule circumscissile; flowers regular, in terminal spikes; anthers free; hydrophytes ..... **SPHENOCLEACEAE**
17b Corolla lobes valvate; capsule dehiscing by valves:
18a Flowers regular; anthers free ..... **CAMPANULACEAE**
18b Flowers irregular, 1- or 2-lipped; anthers cohering in a tube around the style, very rarely free ..... **LOBELIACEAE**

KEY TO MONOCOTYLEDONS (pp. 566–740)

1a Flowers white or otherwise brightly coloured; perianth wholly or partly petal-like:
2a Ovary superior ..... **Group 1** (below)
2b Ovary inferior or half-inferior ..... **Group 2** (p. 26)
1b Flowers with perianth absent or papery, glumaceous to hyaline or sometimes herbaceous, or reduced to hairs or scales:
3a Aquatic herbs, free-floating or submerged ..... **Group 3** (p. 27)
3b Land plants, sometimes rooting in water:
4a Flowers (florets) arranged in small spikes (spikelets) subtended or enclosed by bracts; grasses or grass-like plants..... **Group 4** (p. 27)
4b Flowers not arranged in spikelets ..... **Group 5** (p. 27)

GROUP 1 (*Flowers white or otherwise brightly coloured; perianth wholly or partly petal-like; ovary superior*)

1a Aquatic or marsh herbs:
2a Perianth of 6 petal-like tepals in 2 whorls, blue, white or yellow; gynoecium with an ovary of 3 fused carpels..... **PONTEDERIACEAE**
2b Perianth of 3 coloured sepals or tepals, often accompanied by 3 herbaceous sepals; gynoecium composed of 2–many ± free carpels:
3a Flowers in a simple or 2-branched spike; perianth in a single whorl of 1–3 white to pink tepals.. **APONOGETONACEAE**
3b Flowers whorled or in simple or compound umbels; plants often with white sap:
4a Carpels each with 1 basal ovule; fruit of 3–many achenes ..... **ALISMATACEAE**
4b Carpels each with many ovules on a parietal/marginal placenta; fruit a head of follicles ..... **LIMNOCHARITACEAE**
1b Land plants, sometimes rooting in water:
5a Perianth composed of separate calyx and corolla, the calyx usually herbaceous:
6a Style simple; ovary 2- or 3-locular; flowers in open to congested cymes, with conspicuous corolla often blue or yellow, often subtended by folded or boat-shaped bracts ..... **COMMELINACEAE**
6b Style branched; ovary 1–3-locular; flowers small, crowded in bracteate heads or spikes on long, leafless peduncles:
7a Flowers unisexual; corolla inconspicuous to minute; ovary 3- or 2-locular ..... **ERIOCAULACEAE**
7b Flowers bisexual; petals mostly yellow to white; ovary 1-locular ..... **XYRIDACEAE**
5b Perianth composed of similar or subsimilar tepals, all petal-like:
8a Stamens 3; rootstock often bright orange-red ..... **HAEMODORACEAE**
8b Stamens 6; sometimes outer whorl without anthers:
9a Anthers dehiscing by an apical pore, often unequal; filaments short, inserted at mouth of perianth tube; rootstock a corm..... **TECOPHILAEACEAE**
9b Anthers dehiscing by longitudinal slits (these rarely very short but then plants leafless); rootstock a rhizome, bulb or tuber:
10a Fruit a fleshy berry or drupe:
11a Leaves with 2 basal tendrils; flowers unisexual; plants dioecious ..... **SMILACACEAE**
11b Leaves without basal tendrils; flowers bisexual:
12a Leaf tips narrowing into a coiled tendril ..... **FLAGELLARIACEAE**
12b Leaf tips not as above:
13a Flowers crowded in dense racemes or panicles, longer than 20 mm, tubular below, with exserted stamens; leaves large, tough and crowded; plants rhizomatous or tree-like..... (Convallariaceae in part) **DRACAENACEAE**
13b Flowers few in axillary racemes or cymes, shorter than 10 mm; plants shrubby or scandent:
14a Leaves reduced to scales with a spiny or soft spur; cladodes needle-shaped or leaf-like and without distinct cross-connections between parallel veins ..... **ASPARAGACEAE**

14b Leaves with many prominent parallel veins with distinct cross-connections.....(Behniaceae) **LUZURIAGACEAE**

10b Fruit a capsule:

15a Flowers in umbels subtended by 2 spathaceous bracts and borne on naked peduncles:

16a Flowers perfectly regular with stamens spreading, or anthers sessile; capsule ovoid; plants usually smelling of onion or garlic; rootstock a bulb or rhizome..... **ALLIACEAE**

16b Flowers slightly irregular with stamens declinate and recurved at tips; capsule 3-angled or -winged; plants not smelling of onion or garlic; rootstock a rhizome..... **AGAPANTHACEAE**

15b Flowers in spikes or racemes:

17a Rootstock a bulb:

18a Flowers borne on leafy stems; bulb with loose scales..... ***LILIACEAE** (in narrow sense)

18b Flowers borne on naked peduncles; bulb rarely with loose scales..... **HYACINTHACEAE**

17b Rootstock a rhizome, corm or tuber:

19a Seeds woolly; flowering stems leafless except for a clasping basal leafy bract; leaves petiolate, often absent at flowering; rootstock a tuber.....(Convallariaceae in part) **ERIOSPERMACEAE**

19b Seeds glabrous; flowering stems leafy:

20a Rootstock a corm, rarely a tuber; seeds brown; flowers usually opposite the bracts ..... **COLCHICACEAE**

20b Rootstock a rhizome, sometimes short and with swollen roots; seeds black; flowers in axils of bracts:

21a Flowers borne singly in axils of bracts ..... **ASPHODELACEAE**

21b Flowers more than 1 in axils of bracts .....(including Hemerocallidaceae in part) **ANTHERICACEAE**

GROUP 2 (*Flowers white or otherwise brightly coloured; perianth wholly or partly petal-like; ovary inferior or half-inferior*)

1a Submerged aquatics rooting from a rhizome; flowers mostly unisexual, submerged or floating ..... **HYDROCHARITACEAE**

1b Terrestrial plants or emergent aquatics, but then rootstock cormous and stamens 6:

2a Fertile stamens 5(6) or 1, but then supported by and not fused to the style; leaves pseudopetiolate with a broad base, midrib prominent and secondary veins pinnate-parallel:

3a Fertile stamen 1:

4a Outer tepals united into a tube; anther 2-thecous; filament thread-like ..... **ZINGIBERACEAE**

4b Outer tepals free; anther 1-thecous; stamen partly petal-like..... ***CANNACEAE**

3b Fertile stamens 5(6):

5a Flowers unisexual, upper 5 tepals fused below; leaves spirally inserted; stems not woody, drying after fruiting, sometimes suckering; fruit a banana with seeds embedded in pith..... **MUSACEAE**

5b Flowers bisexual, lateral inner tepals fused and enclosing style and stamens; leaves distichous; stems and rootstock perennial; seeds pea-like with a tuft of hairs ..... **STRELITZIACEAE**

2b Fertile stamens 3(4)6 or 1, but then fused to the style into a complex columnar structure; leaf venation never pinnate-parallel:

6a Stamen 1, united with style into a column (gynostemium); pollen agglutinated into masses (pollinia); upper or lower median tepal often elaborated and spurred ..... **ORCHIDACEAE**

6b Stamens 3(4) or 6; pollen not agglutinated into masses:

7a Flowers unisexual, in spikes or racemes; climbers with ± heart-shaped leaves..... **DIOSCOREACEAE**

7b Flowers bisexual:

8a Stamens 3, opposite outer tepals; leaves mostly unifacial; rootstock a corm or rhizome ..... **IRIDACEAE**

8b Stamens 6 or 3, but then opposite inner tepals:

9a Inflorescence apparently an umbel (sometimes 1-flowered), subtended by 1 or more spathaceous bracts and borne on a naked scape; rootstock a bulb or rhizome ..... **AMARYLLIDACEAE**

9b Inflorescence a corymb, raceme, panicle, cyme or 1-flowered, not subtended by spathaceous bracts; rootstock a corm or rhizome (rarely reduced):

10a Small saprophytic herbs with a few narrow basal leaves or leaves scale-like..... **BURMANNIACEAE**

10b Photosynthetic plants with well-developed leaves:

11a Robust, rosulate plants with tree-like inflorescences and large, spine-tipped, leathery or succulent leaves persisting for several years..... ***AGAVACEAE**

11b Smaller plants, often coarsely hairy; leaves never spine-tipped:

12a Flowers many, in helicoid cymes borne on bracteate stalks; ovules 1 or 2 per locule:

13a Stamens 3; pubescence of simple hairs; rhizome often bright red ..... **HAEMODORACEAE**

13b Stamens 6; pubescence of plumose hairs..... **LANARIACEAE**

12a Flowers mostly solitary or few borne on leafless scapes or pedicels; ovules many per locule:

14a Shrublets or short-stemmed perennials; leaves fibrous, abscising below, persistent bases stiffly fibrous and closely imbricate; flowers solitary, purple to mauve or white, with septal nectaries; seeds white to yellowish ..... **VELLOZIACEAE**

14b Acaulescent perennials; leaves softer, decaying irregularly, bases loosely fibrous and not regularly imbricate; flowers 1 to many, yellow, white pink to red, without nectaries; seeds black..... **HYPOXIDACEAE**

GROUP 3 (*Aquatic herbs, free-floating or submerged (flowers sometimes emergent); perianth absent or cupular or scale-like to well developed*)

1a Plants floating freely on the surface, though sometimes attached to the substrate in very shallow water:
2a Small, ± disc-shaped to globular annuals not differentiated into stems and leaves; flowers borne in pouches or sheaths... (Araceae in part) **LEMNACEAE**
2b Rosette-forming, stoloniferous herbs with oblong, hairy leaves; flowers borne on a small spadix surrounded by a tubular spathe **ARACEAE**
1b Plants rooted or freely suspended with leaves submerged or floating:
3a Gynoecium composed of 2 or more free carpels with separate styles and stigmas:
4a Perianth absent or cupular; stamens 1 or 2:
5a Flowers bisexual, in spikes above water at anthesis, spikes consisting of 2 naked flowers facing in opposite directions and borne at different heights; carpels 4–8, becoming stipitate in fruit and appearing umbellate; stamens 2, free **RUPPIACEAE**
5b Flowers unisexual, submerged, axillary, cymose or solitary; carpels 1–9, stipitate; stamens 1 or 2, united:
6a Marine plants, dioecious; pollen filamentose **CYMODOCEACEAE**
6b Brackish or freshwater plants, monoecious; pollen globose **ZANNICHELLIACEAE**
4b Perianth present, composed of 1–4 free tepals; stamens 3–many:
7a Leaves borne on elongated stems; tepals usually 4; inflorescence a simple spike not enclosed in a spathe when young **POTAMOGETONACEAE**:
7b Leaves all basal; tepals 1–3; inflorescence a 2-branched or simple spike at first enclosed in a spathe:
8a Flowers in a 2-branched or simple spike on an elongated axillary peduncle at first enclosed in a spathe; flowers without bracts **APONOGETONACEAE**
8b Flowers whorled or in simple or compound umbels; plants often with white sap:
9a Carpels each with 1 basal ovule; fruit of 3–many achenes **ALISMATACEAE**
9b Carpels each with many ovules on a parietal placenta; fruit a head of follicles **LIMNOCHARITACEAE**
3b Gynoecium composed of 1 carpel or of 2 or more united carpels with free or united styles:
10a Perianth present; ovary inferior, 1-locular with many ovules on parietal placentas; flowers mostly unisexual, submerged in marine species, exserted during anthesis in others; male flowers sometimes becoming detached and free-floating **HYDROCHARITACEAE**
10b Perianth absent; ovary superior, with a solitary ovule:
11a Leaves opposite or verticillate, often toothed; flowers solitary or few together in leaf axils; freshwater plants **NAJADACEAE**
11b Leaves alternate; inflorescence a spike of alternating male and female flowers enclosed in a spathe; marine plants **ZOSTERACEAE**

GROUP 4 (*Flowers (florets) arranged in small spikes (spikelets) subtended or enclosed by bracts; grasses and grass-like plants*)

1a Leaves reduced to sheaths with free margins; plants dioecious; florets with a perianth of 6 tepals in 2 whorls **RESTIONACEAE**
1b Leaves usually with a well-developed blade and a sheathing base; plants very rarely dioecious; florets mostly with 2–6 scale-like bracts or bristles:
2a Leaves 2-ranked; leaf sheaths usually with free, overlapping margins; stems terete or compressed, usually with hollow internodes; style branches and stigmas usually 2, feathery; anthers deeply sagittate and therefore appearing dorsifixed **POACEAE**
2b Leaves often 3-ranked, mostly crowded in a basal tuft; leaf sheaths usually closed; stems often 3-angled, with solid internodes; style branches and stigmas 2 or 3, not feathery; anthers basifixed **CYPERACEAE**

GROUP 5 (*Land plants, sometimes rooting in water; perianth glumaceous to hyaline, or sometimes herbaceous, or reduced to bristles or scales*)

1a Leaves pinnately or palmately compound; palms **ARECACEAE**
1b Leaves simple:
2a Inflorescence a very dense cylindrical spike with female florets below and male ones above; perianth segments reduced to bristles **TYPHACEAE**
2b Inflorescence various, not as above:
3a Inflorescence a dense fleshy spike (spadix) subtended by a conspicuous or long, leaf-like spathe:
4a Leaves arranged in 2 vertical rows, not differentiated into petiole and blade; spathe leaf-like, much longer than spadix ***ACORACEAE**
4b Leaves alternate, differentiated into petiole and blade; spathe conspicuous, of various colours **ARACEAE**
3b Inflorescence various, not a spadix:
5a Perianth segments herbaceous; fruit separating into 3 cocci; leaves radical **JUNCAGINACEAE**
5b Perianth segments dry and glumaceous to hyaline; leaves basal, cauline or reduced to sheaths; plants often rush-like:
6a Tufted herbs with radical leaves and small to minute flowers crowded in terminal, compact, head-like inflorescences borne on naked peduncles:
7a Flowers unisexual; ovary 3- or 2-locular **ERIOCAULACEAE**

7b Flowers bisexual; ovary 1-locular ..... **XYRIDACEAE**

6b Combination of characters not as above:

8a Leaves reduced to sheaths; flowers unisexual, sexes on separate plants; ovary 1- or 3-locular with 1 ovule per locule ..... **RESTIONACEAE**

8b Leaves with blades; flowers bisexual; ovary 1–3-locular with 3 or more ovules per locule:

9a Plants caulescent, up to 2 m or higher, with apical leaf rosette; leaves serrate; ovules few; stigmas sessile or subsessile ..... (Juncaceae in part) **PRIONIACEAE**

9b Plants rhizomatous, with basal, entire leaves; ovules many; style short or long ..... **JUNCACEAE**

GYMNOSPERMS

Cupressaceae

(Pinopsida)

Compiled by H.F. Glen

Monoecious or occasionally dioecious, evergreen trees or shrubs; wood containing resin. **Leaves** usually of two types, in juvenile form often needle-like, spirally or subspirally arranged and spreading, in adult form usually small, scale-like, whorled or decussate, ± appressed and completely hiding the stem. **Male cones** catkin-like, small, mostly terminal and solitary; scales few to many, decussate or in whorls of 3, bearing at base on abaxial surface 2–10 pollen sacs; pollen grains without wings or air-bladders. **Female cones** with enlarged leathery or woody, valvate or imbricate and finally gaping scales, rarely fleshy and berry-like (**Juniperus*); scales few to many, all or most fertile, bearing 1–20 erect ovules at base on adaxial surface. **Seeds** free, rarely united in a stone, mostly winged; testa crustaceous to woody. **Cotyledons** 2, rarely 3–6.

Genera ± 16, species ± 115, cosmopolitan; sthn Afr.: 3 genera (2 exotic), 5 species (2 exotic).

Stapf: 14 (1933); Marsh: 43 (1966), the basis of this account; Page: 302 (1990); Von Breitenbach & Von Breitenbach: 179 (1992).

Key to genera

1a Female cones fleshy ..... ***Juniperus**

1b Female cones dry and woody:

2a Female cones ovoid to oblong, with 4 (rarely 6) ± oblong scales ..... **Widdringtonia**

2b Female cones subspherical to globose, usually with 8 peltate scales ..... ***Cupressus**

*Cupressus L. 0043000

Linnaeus: 1002 (1753); Linnaeus: 435 (1754); Eckenwalder: 405 (1993).

Trees or large shrubs; branchlets terete or quadrangular, in decussate arrays. **Leaves** opposite, in 4 ranks; adult leaves appressed to divergent, scale-like, rhomboid, free portion of long-shoot leaves up to 4 mm long; abaxial gland present or absent. **Male cones** with 4–10 pairs of sporophylls, each sporophyll with 3–10 pollen sacs. **Female cones** maturing in 1–2 years, generally persisting closed for many years, or until opened by fire, globose or oblong, 10–40 mm in diameter; scales in 3–6 pairs, valvate, peltate, thick and woody, persistent. **Seeds** 5–20 per scale, lenticular or faceted, narrowly 2-winged; cotyledons 2–5. $x = 11$.

Species ± 13, warm north temperate regions; 1 species: **Cupressus arizonica* Greene, naturalised in Free State and Eastern Cape.

*Juniperus L. 0045000

Linnaeus: 1003 (1753); Linnaeus: 461 (1754); Welch: 84 (1986); Adams: 412 (1993).

Sabina Mill. (1754).

Monoecious or dioecious shrubs or trees with thin, shredding bark; branchlets terete, 3–6-angled, variously oriented but not in flattened sprays. **Leaves**: juvenile leaves needle-like, usually in whorls of 3, spreading, acute to mucronate, with 1 or 2 pale bands on upper surface; adult leaves opposite, in 4 ranks, closely appressed to divergent, scale-like to subulate, free portion up to ± 10 mm long; abaxial gland visible or not, usually elongate, sometimes exuding white crystalline deposit. **Male cones** with 3–7 pairs or trios of sporophylls, each sporophyll with 2–8 pollen sacs. **Female cones** maturing in 1 or 2 years, globose to ovoid, fleshy, 3–20 mm in diameter, remaining closed, usually glaucous; scales persistent, in 1–3 pairs, peltate, tightly coalesced, usually thick and fleshy. **Seeds** 1–3 per scale, round to faceted, wingless; cotyledons 2–6. $x = 11$.

Species ± 60, temperate to subtropical northern hemisphere; 1 species: **Juniperus virginiana* L., recorded as naturalised in sthn Afr. (Free State).

Widdringtonia Endl. 0038010

Endlicher: 25 (1842); Stapf: 15 (1933); Marsh: 43 (1966); Page: 309 (1990); Von Breitenbach & Von Breitenbach: 181 (1992).

Monoecious trees or shrubs; wood fragrant, easily worked, containing oil and resin. **Leaves**: juvenile leaves needle-like and subspirally arranged; adult leaves scale-like and appressed, decussate or alternate but not in whorls of 3 or 4. **Male cones** small, ± 4 mm long, solitary, terminal, mostly on short lateral branchlets; scales in (5)6(7) pairs, decussate, coriaceous, peltate, normally with 4 pollen sacs at base of each scale. **Female cones** small, axillary, on elongated shoots, single or clustered; scales 4(5 or 6) of equal size and arranged in one whorl, corky-coriaceous, apiculate, divaricate at time of pollination, then closing; ovules several at base of each scale; mature cones woody, 13–25 mm in diameter, opening at apex, with 4 very thick, woody valves, often with a prominent dorsal cusp; exterior of valves smooth to warty. **Seeds** ovoid or trigonous, winged; testa crustaceous; cotyledons 2, rarely 3, green, needle-like.

Species 3, tropical and sthn Afr.; Northern Province, Mpumalanga, KwaZulu-Natal, Western and Eastern Cape, with 1 extending into tropical Africa.

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*Pinaceae

(Pinopsida)

Compiled by H.F. Glen

Highly resinous, monoecious shrubs or trees. **Leaves** deciduous or evergreen, usually with resin canals, acicular, linear or oblong, solitary and spirally arranged on all shoots, and later densely grouped on short, lateral, spur shoots, soft, stiff, flexible, rigid or asperous in texture. **Shoots** glabrous, pubescent or hairy, usually with distinctive, rhythmic annual growth increments, and scaly, terminal, often resinous buds in resting season. **Cones**: male and female usually on same tree, female often appearing later, or borne mostly on higher branches. **Male cones** catkin-like, solitary or grouped, axillary, each cylindric with many, spirally arranged microsporophylls with two pollen sacs on lower surface of each; pollen grains with 2 air-bladders. **Female cones** solitary, in irregular groups or whorled, erect, suberect or pendent, sessile or shortly stalked, rounded or elongate, frequently large, each with many spirally arranged scales and ± conspicuous bracts; scales each with two ovules on upper (adaxial) surface, leathery or fleshy at first, becoming stiff, woody, flexible, papery or leathery with age, and sometimes highly resinous, maturing in 1–3 seasons and eventually dismembering on tree, or scales opening on tree to release seed. **Seeds** winged or unwinged, 2 to each scale; cotyledons of variable number, sometimes many. $x = 12$.

Genera ± 12, species ± 200, almost exclusively northern hemisphere; 1 genus naturalised in sthn Afr.

Jessop: 42 (1966); Page: 319 (1990); Farjon: 1(1990).

*Pinus L. 0022000

Linnaeus: 1000 (1753); Jessop: 42 (1966); Farjon: 13 (1984), no genus description as such, page reference is to reproductive morphology; Page: 329 (1990); Perry: 25 (1991).

Description as for family.

Species ± 80, northern hemisphere, many species cultivated, several occur as escapes in sthn Afr. and 8 have become naturalised, mainly in the moister parts of the region.

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Podocarpaceae

(Pinopsida)

Compiled by H.F. Glen

Trees or shrubs, dioecious, evergreen. **Leaves** spirally arranged, subopposite or whorled, rarely opposite, linear to narrowly ovate or scale-like, long-persistent. **Male cones** usually consisting of many fertile scales, each bearing 2 pollen sacs, axillary, rarely terminal, sessile to shortly stalked, catkin-like, solitary or in groups of 2–5; pollen grains usually with 2 air-bladders or wings. **Female cones** axillary, on thin naked stalks or on short leafy or scaly branches, usually reduced to 1 or 2 fertile, terminal scales and a few sterile, lower scales fused with each other and with cone axis; fused cone axis and scales beneath seeds either remain woody or become swollen and often fleshy at maturity (receptacle). **Ovule** solitary, adnate to face of fertile scale, inverted and enclosed in a false aril (epimatium) arising from face of scale and adnate to single integument. **Seeds** ellipsoid to globose; testa and false aril form a coriaceous or externally fleshy and internally ± woody shell; embryo axile; cotyledons 2. $x = 13$.

Genera 17, species ± 125, in tropics at high altitudes, subtropics and temperate zones, mainly of southern hemisphere, including Africa, Asia, Australasia and South America; 1 genus in sthn Afr.

Stapf: 3 (1933); Phillips: 50 (1951) as Taxaceae; Leistner: 34 (1966); Page: 332 (1990); Von Breitenbach & Von Breitenbach: 131 (1992).

Podocarpus L'Hér. ex Pers. 0013000

Persoon: 580 (1807) name conserved; Stapf: 3 (1933); Leistner: 34 (1966); Page: 340 (1990); Von Breitenbach & Von Breitenbach: 133 (1992).

Description as for family.

Species nearly 100, mainly in montane forest of tropics and subtropics and at lower altitudes in temperate regions mainly in southern hemisphere; 4 in sthn Afr. (Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Western and Eastern Cape).

De Laubenfels (1985) gives a description of infrageneric taxa, but no genus descriptions. Page (1990) places one sthn Afr. species: *Podocarpus falcatus* (Thunb.) R.Br. ex Mirb., in his genus *Afrocarpus*. See Leistner *et al.* (1995) for reasons why only one genus is recognised in this work.

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Stangeriaceae

(Cycadopsida)

Compiled by H.F. Glen

Plants dioecious, with thick roots merging into simple or branched subterranean stems. **Stem** tuberous, with leaf or leaves from apex of each stem or branch, alternating with series of small scale-like bracts. **Leaves** pinnate, 1–4 from each stem, somewhat fern-like, petiolate, deciduous; leaflets in several to many opposite or subopposite pairs, with a conspicuous midrib and dichotomously forked lateral veins. **Cones** with scales (sporophylls) arranged spirally, tightly imbricate upwards. **Male scales** with pollen cells stipitate on lower surface towards base; pollen ellipsoidal, without wings or air-bladders. **Female scales** stalked, with 2 ovules, 1 on either side and above pedicel and with micropyle directed towards cone axis; scale head, or bulla shield-like, with incurved lateral lobes. **Seeds** with fleshy outer layer tightly adhering to hard inner shell encasing copious endosperm; cotyledons 2. $x = 6$.

A monotypic family confined to South Africa.

Hutchinson & Rattray: 25 (1933) pro parte; Dyer: 1 (1966); Johnson & Wilson: 370 (1990); Goode 24 (1989).

Stangeria T.Moore 0002000

Moore: 228 (1853); Hutchinson & Rattray: 25 (1933); Dyer: 1 (1966); Johnson & Wilson: 371 (1990); Jones: 265 (1993).

Description as for family.

Species 1: *Stangeria eriopus* (Kunze) Nash, N KwaZulu-Natal to Eastern Cape near East London, in coastal grassland and forest.

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*Taxodiaceae

(Pinopsida)

Compiled by H.F. Glen

Medium-sized or large, monoecious, evergreen or deciduous trees, usually with shredding bark. **Leaves** usually linear or broadly awl-shaped, spirally arranged but sometimes appearing 2-ranked, or, more rarely, needle-like and in clusters. **Male cones** small, solitary or in clusters; pollen sacs 2–9 per scale, pollen without air-bladders. **Female cones** with bracts and cone scales free when young, but closely fused later; ovules 2–9 per scale; mature cones broadly ellipsoid, ovoid or almost spherical, scales persistent, spirally arranged, leathery or woody. **Seeds** 2–9 on each scale, usually winged.

Genera 10, species ± 14, mostly from E Asia but extending to Tasmania, and with 3 genera in North America; sthn Afr.: 2 exotic genera each with 1 naturalised species.

Dallimore & Jackson: 20 (1966); Lewis: 77 (1986); Page: 353 (1990).

Key to genera

Leaves 2-ranked, flattened; male cones in paniculate clusters ..... ***Taxodium**
Leaves spirally arranged, triangular in section; male cones in lateral, axillary, spicate clusters ..... ***Cryptomeria**

***Cryptomeria** D.Don 0034000

Don: 233 (1838); Dallimore & Jackson: 183 (1966), good account of numerous cultivars; Lewis: 79 (1986); Page: 357 (1990).

Evergreen, buttressed, monoecious trees up to 50 m tall in the wild, up to 30 m tall in cultivation; bark reddish brown, shredding. **Branchlets** hairless, deciduous. **Leaves** up to 20 mm long, spirally arranged in 5 ranks, persisting for 4 or 5 years, awl-shaped, blunt, margins incurved. **Male cones** ± 7.5 mm long, terminal, in clusters of 20 or more, orange or red when ripe. **Female cones** on short branchlets, surrounded by small rosettes of leaves; mature cones solitary, spherical, ± 15 mm long; scales 20–30, with 2 or 3 lobes and a recurved, triangular point on back; ovules erect. **Seeds** triangular, very narrowly winged. $x = 11$ (aneuploids, polyploidy).

Species 2 or more, China and Japan; sthn Afr.: **Cryptomeria japonica* (L.f.) D.Don, is recorded as naturalised in the KwaZulu-Natal midlands.

***Taxodium** Rich. 0035000

Richard: 298 (1810); Dallimore & Jackson: 583 (1966); Lewis: 77 (1986); Page: 361 (1990); Watson: 403 (1993).

Deciduous or evergreen trees. **Branchlets** terete. **Lateral roots** commonly producing erect, irregularly conic to rounded 'knees' in periodically flooded habitats. **Leaves** alternate, in 2 ranks; adult leaves

divergent to strongly appressed, linear or linear-lanceolate to deltate, generally flattened, free portion up to ± 17 mm long; abaxial glands absent. **Male cones** with 10–20 sporophylls, each sporophyll with 2–10 pollen sacs. **Female cones** maturing and shattering in one season, nearly globose; scales falling early, 5–10, valvate, ± peltate, thin and woody. **Seeds** (1)2 per scale, irregularly 3-angled, wingless; cotyledons 4–9. $x = 11$ (B-chromosomes).

Species 1(–3): North America, Mexico, Guatemala; 1 in sthn Afr.: **Taxodium distichum* (L.) Rich., naturalised in the KwaZulu-Natal midlands.

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Welwitschiaceae

(Gnetopsida)

Compiled by H.F. Glen

Plant dioecious; stem woody, unbranched (closed system of growth), broadly obconic or turbinate, concave on top, outer covering corky; taproot elongated, branching near apex. **Leaves** produced from subcircular groove around rim of crater-like apex of plant, parallel-veined, persistent, growing from base. **Inflorescences** arising from floriferous cushions above and sometimes also below insertion of leaf. **Flowers** unisexual (male pseudo-bisexual but functionally unisexual), borne singly in axils of scales forming small cones. **Male flowers**: perianth segments 4, in 2 whorls; stamens 6, with filaments connate at base; anthers 3-thecate, dehiscing by 3 slits at summit, pollen grains ellipsoidal with ± 20 longitudinal ridges; ovule single, abortive, with integument produced into a style-like tubular structure and expanded at apex into a stigma-like, papillose disc. **Female flowers**: perianth segments 2, navicular, united along margins to enclose the ovule, flattened, with wings developing along keels; ovule with single integument produced into style-like tubular structure which eventually is exserted, widened and lobed at apex. **Seeds** winged; cotyledons 2, endospermous.

Monotypic family, Namibia and Angola.

Pearson: 1 (1933); Verdoorn: 48 (1966), the basis of this account; Friedrich-Holzhammer: 1 (1967); Kubitzki: 387 (1990); Von Breitenbach & Von Breitenbach: 209 (1992).

Welwitschia Hook.f. 0048000

Hooker: 71 (1862); Pearson: 1 (1933); Verdoorn: 49 (1966); Friedrich-Holzhammer: 1 (1967); Kubitzki: 390 (1990); Von Breitenbach & Von Breitenbach: 211 (1992).

Description as for family.

Species 1: *Welwitschia mirabilis* Hook.f., confined to the Namib desert in Namibia and Angola.

The Standing Committee on the Stabilization of Specific Names decided (Schubert 1975) that the specific name *Welwitschia mirabilis* Hook.f. takes priority over *W. bainesii* (Hook.f.) Carr. on the grounds that the latter was based on the provisional name *Tumboa bainesii* Hook.f.

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Zamiaceae

(Cycadopsida)

Compiled by H.F. Glen

Plants dioecious, palm-like with main root or roots tuberous. **Stem** subterranean or aerial, occasionally up to 10 m tall, unbranched or branched from base, rarely branched above and then largely due to injury, covered by alternating series of woolly bracts and persistent swollen truncated leaf bases (pulvini). **Leaves** arising from apex of stems, spirally arranged, persisting 2–several years, petiolate, pinnate with a straight or curved rachis; leaflets pungent-pointed, entire, toothed or lobed on one or both margins, reduced in size towards base of rachis, sometimes to prickles, with longitudinal parallel venation and no midrib; leaflets of seedlings of all species with several teeth around apex. **Cones** 1–5, sometimes more, from near or around apex of stem, glabrous to densely woolly, pedunculate; peduncle of male cones somewhat longer than those of female cones in same species. **Male cones** subcylindric; scales densely packed in many spiral rows, terminating in a sterile truncate apex or beak; pollen cells in dense clusters on lower surface. **Female cones** cylindric to oval, broader than male; scales tightly packed, stalked, each bearing 2 collateral ovules, with micropyle directed towards axis of cone, on inner (adaxial) surface, one on either side of and along upper side of stalk, with an enlarged peltate head (bulla); bulla face flat or somewhat protruding and with lateral ridges extending into incurved lateral lobes, having mainly an upper, lower and terminal facet. **Seeds** red, yellow, amber or brownish with age, fleshy, oblong, angled by compression, with apical fleshy end

variable in length, with a thin, hard, subglobose or oblong-ovoid inner shell encasing copious endosperm, having a long maturing period on cone whether fertile or not; cotyledons 2. $x = 9$.

Genera 8, species over 100, tropical to warm-temperate regions mainly in southern hemisphere, in America, Africa, East Indies and Australia; sthn Afr.: genus 1, species ± 30.

Hutchinson & Rattray: 24 (1933), under Cycadaceae; Dyer & Verdoorn: 3 (1966); Johnson & Wilson: 371 (1990); Von Breitenbach & Von Breitenbach: 27 (1992).

Encephalartos Lehm. 0005000

Lehmann: 3, t. 1–5 (1834); Hutchinson & Rattray: 28 (1933); Dyer: 432 (1965); Dyer & Verdoorn: 5 (1966); Goode: 28 (1989), no genus description; excellent pictures and species data; Johnson & Wilson: 373 (1990); Von Breitenbach & Von Breitenbach: 29 (1992); Jones 177 (1993).

Description as for family.

Species ± 45, central and sthn Afr.; ± 30 in sthn Afr., mainly in the higher-rainfall, eastern parts of the area (Northern Province, North-West, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape).

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DICOTYLEDONS

Acanthaceae

(Asteridae—Scrophulariales)

Compiled by K. Balkwill & W.G. Welman

Herbs, shrublets, shrubs, sometimes climbers or small trees, often with ± swollen nodes, sometimes spiny. **Leaves** opposite, rarely radical (*Elytraria*), mostly entire, simple, lamina often with cystoliths (mineral concretions) showing up as streaks or protuberances in dried material; stipules 0. **Inflorescence** based on dichasial and monochasial cymes; mostly bracteate, bracts often conspicuous, leaf-like or petaloid and subtending individual flowers. **Flowers** bisexual, mostly irregular. **Calyx** 4- or 5-partite (10–18-partite in *Thunbergia*), rarely 2-lipped, mostly shorter than corolla. **Corolla** gamopetalous, 1- or 2-lipped, or (3, 4)5-lobed, sometimes resupinate; tube cylindric, funnel-shaped or campanulate; when 2-lipped upper lip usually entire, emarginate or 2-toothed, sometimes with a rugula (central channel) accommodating the style, and sometimes with lateral staminal channels accommodating the stamens (in *Adhatoda*); lower lip 3-lobed or 3-toothed. **Stamens** arising on corolla, alternating with lobes, usually 4, sometimes didynamous, or 2, included or exserted; filaments normally linear; anthers 1- or 2-thecous, with thecae parallel to superposed, muticous or variously elaborated at base, sometimes ciliate; pollen prolate or, less often, sphaeroidal, 2- or 3- (col)porate; staminodes mostly 0, occasionally (1)2(3). **Disc** nectariferous, annular to deeply cupuliform. **Ovary** superior, 2-carpellate, 2-locular, with (1)2(3 or more) axile, usually anatropous ovules in each locule; style terete or long-filiform, included or exserted; stigma simple, or equally, or unequally 2-lobed. **Fruit** a 2-locular, loculicidally, often explosively, dehiscent capsule, ± club-shaped or ellipsoid; in a few genera placentas are elastic (i.e. remain attached to top of capsule and spring up from base). **Seeds** mostly borne on a retinaculum or jaculator (an elaboration of the funicle) except for a few genera of controversial inclusion (*Elytraria*, *Nelsonia*, *Thunbergia*), usually as many as ovules, usually ± lenticular, sometimes ± globose, smooth, rugose, tuberculate or muricate, sometimes covered with hygroscopic hairs or with hygroscopic hairs restricted to rim; endosperm 0 (except in Nelsonioideae); embryo large.

Genera ± 350; species ± 4350, abundant in tropics and subtropics; sthn Afr.: genera 42, species ± 350. **Acanthus pubescens* (Oliv.) Engl. is found as an occasional garden escape in the Northern Province.

Burkill & Clarke: 1 (1899); Burkill & Clarke: 193 (1900); Clarke: 1 (1901); Meyer: 1 (1968); Balkwill & Immelman: 1 (1995); Mabberley: 4 (1997).

Classification of sthn Afr. Acanthaceae

I. Subfamily NELSONIOIDEAE (ovules many; retinacula 0): *Elytraria, Nelsonia*
II. Subfamily THUNBERGIOIDEAE (ovules 4; retinacula 0): *Thunbergia*
III. Subfamily ACANTHOIDEAE (ovules 2–many; retinacula present):
1. Tribe **Acantheae**: *Acanthopsis, Blepharis, Crossandra, Sclerochiton*
2. Tribe **Ruellieae**:
   a. Subtribe Barleriinae: *Barleria*
   b. Subtribe Ruelliinae: *Crabbea, Ruellia, Ruelliopsis*
   c. Subtribe Petalidiinae: *Chaetacanthus, Duosperma, Dyschoriste, Hemigraphis, Hygrophylla, Lepidagathis, Petalidium, Phaulopsis*
3. Tribe **Justicieae**:
   a. Subtribe Diclipterinae: *Dicliptera, Hypoestes, Peristrophe*
   b. Subtribe Isoglossinae: *Isoglossa*
   c. Subtribe Justiciinae: *Adhatoda, Anisotes, Duvernoia, Justicia, Metarungia, Monechma, Rhinacanthus, Siphonoglossa*
   d. Subtribe Odontoneminae: *Asystasia, Chorisochora, Ecbolium, Glossochilus, Mackaya, Megalochlamys, Pseuderanthemum, Ruspolia, Ruttya, × Ruttyruspolia, Salpinctium*

Neuracanthus is currently of doubtful affinity. It is thought to be either a member of Acantheae, Ruellieae or in a tribe of its own.

Key to genera

1a Seeds not borne on retinacula:
  2a Plants with rosulate leaves and scapose inflorescences; scape covered with alternate bracts from base to tip ..... **Elytraria**
  2b Plants with internodes visible between leaves; bracts in inflorescence opposite:
    3a Plants prostrate, rooting at the nodes; corolla shorter than 12 mm ..... **Nelsonia**
    3b Plants upright herbs or creepers, not rooting at the nodes; corolla longer than 12 mm ..... **Thunbergia**
1b Seeds borne on retinacula:
  4a Corolla 1-lipped, with the adaxial suture slit; stamens 4, all monothecous:
    5a Stamens included in corolla tube, filaments epipetalous for most of their length, slender; corolla yellow, orange or red ..... **Crossandra**

5b Stamens exserted beyond corolla throat; filaments epipetalous for up to half of their length, stout; corolla white, blue or purple or various combinations of these:
6a Calyx with 5 lobes; seed surface convoluted and without hygroscopic structures ..... **Sclerochiton**
6b Calyx with 4 lobes; seed surface with feathery hygroscopic structures:
7a Anticous (outer) filaments branched at tip; ovary with 2 glands at tip; style with 2 unequal short branches .. **Blepharis**
7b Anticous (outer) filaments not branched at tip; ovary without 2 glands at tip; anticous style branch enlarged and flattened, posticous branch minute ..... **Acanthopsis**
4b Corolla 2-lipped, subregular or regular, adaxial suture not slit; if 4 stamens present, then at least 2 are 2-thecous:
8a Calyx 2-lipped with one lip of 3 lobes and one of 2; lobes fused for most of their length; corolla rotate above, with induplicate aestivation; filaments bifurcate at apex ..... **Neuracanthus**
8b Calyx not 2-lipped, or if obscurely so, then lobes free for most of their length; corolla not rotate and not with induplicate aestivation; filaments not bifurcate at apex:
9a Seeds with hygroscopic uniseriate hairs; corolla aestivation contorted or occasionally imbricate, but then not ascending; fertile stamens 4, or if 2 then pollen with many pseudocolpi (*Chaetacanthus*) or globose with deep reticulations and pores (*Barleria*):
10a Stamens not didynamous; calyx lobes 4, adaxial and abaxial lobes larger than lateral lobes ..... **Barleria**
10b Stamens didynamous; calyx usually of 5 lobes or if of 4 lobes, then these are equal in size:
11a Corolla distinctly 2-lipped and with rugula in upper lip; either with 2 bosses on lower corolla lip or with more than 2 seeds in each locule:
12a Seeds 2 in each locule; outer lobe of lower lip of corolla outermost in bud, lower lip without yellow bosses ..... **Lepidagathis**
12b Seeds 5 or more in each locule; corolla contorted in bud and with 2 bosses on lower lip ..... **Hygrophila**
11b Corolla regular or subregular or if 2-lipped then without a rugula in upper lip, without yellow bosses on lower corolla lip and with 1 or 2 seeds in each locule:
13a Corolla regular; fruits with inelastic placental bases:
14a Corolla contorted in bud; disc cupular; inflorescence a highly congested dichasial cyme surrounded by bracts ..... **Crabbea**
14b Corolla quincuncial in bud; disc annular; inflorescence not as above:
15a Anthers spurred; upper lobe of stigma absent; seeds 1 or 2 in each locule; pollen banded ..... **Ruelliopsis**
15b Anthers muticous; upper lobe of stigma present, although smaller than lower; seeds 3 or more in each locule; pollen with large reticulations ..... **Ruellia**
13b Corolla distinctly 2-lipped, or if corolla subregular then fruits with elastic placental bases:
16a Fruit with elastic placental bases; corolla obscurely 2-lipped:
17a Anticous calyx lobe much bigger than other 4 and bigger than bracts; corolla shorter than 15 mm, white, throat yellowish ..... **Phaulopsis**
17b All calyx lobes equal in size, usually enclosed by a pair of showy bracts; corolla usually longer than 15 mm and showy ..... **Petalidium**
16b Fruit with inelastic placental bases; corolla clearly 2-lipped:
18a Fertile stamens 2 ..... **Chaetacanthus**
18b Fertile stamens 4:
19a Capsule with 1 seed in each locule ..... **Duosperma**
19b Capsule with 2 or more seeds in each locule:
20a Capsule with 2 seeds in each locule ..... **Dyschoriste**
20b Capsule with 3 or more seeds in each locule ..... **Ruellia**
9b Seeds without hygroscopic, uniseriate hairs (although they may have tubercles or hygroscopic glochidiate hairs); corolla aestivation ascending; fertile stamens 2, or if 4 then pollen colporate with shallow reticulations (*Asystasia*, *Salpinctium* and *Glossochilus*):
21a Corolla with a distinct rugula in upper lip:
22a Pollen spheroidal, with a pusticulate ring of exine around the equator; anthers in species with cream flowers attached at right angles to filaments ..... **Isoglossa**
22b Pollen prolate; anthers attached parallel to filaments:
23a Corolla orange, red or yellowy brown, lower lip longer than 25 mm and narrower than 10 mm:
24a Capsules with elastic placental bases ..... **Metarungia**
24b Capsules with inelastic placental bases ..... **Anisotes**
23b Corolla white, cream, lilac, pink, purple or blue, lower lip shorter than 25 mm or if longer, then broader than 10 mm:
25a Corolla tube longer than lips:
26a Style with branches longer than broad; inflorescences terminal as well as axillary ..... **Rhinacanthus**
26b Style with very short (broader than long) branches; inflorescences axillary ..... **Siphonoglossa**
25b Corolla tube shorter than lips:
27a Seeds single in each locule, smooth and shiny ..... **Monechma**
27b Seeds paired in each locule, rough and often tuberculate (sometimes a single, smooth, shiny seed is borne in an indehiscent capsule):
28a Calyx lobes shorter than tube; staminal channels present in upper lip of corolla and at least half as long as lip ..... **Duvernoia**
28b Calyx lobes longer than tube; staminal channels absent or less than half as long as upper lip:
29a Inflorescence pedunculate and diffuse; anticous corolla lip deeply divided, palate of 2 smooth tumuli (small mounds) ..... **Justicia**

29b Inflorescence sessile, or if pedunculate then strobilate; palate rugose:
30a Lower anther thecae muticous or shortly tailed; lips of corolla nearly equally long; upper lip deeply hooded ..... **Adhatoda**
30b Lower anther thecae with short or long tails; upper lip of corolla shorter than lower; upper lip shallowly hooded ..... **Justicia**

21b Corolla without or with indistinct rugula in upper lip:
31a Corolla not resupinate; seeds usually more than 3 mm in diameter; anther thecae ± parallel; inflorescences terminal thyrses or monochasia or single axillary flowers:
32a Stamens 4:
33a Flowers single in axils ..... **Glossochilus**
33b Flowers in (usually terminal) monochasia or lax terminal thyrses:
34a Corolla 2-lipped; pollen with processes associated with pores ..... **Salpinctium**
34b Corolla campanulate above, ± 2-lipped; pollen without processes associated with pores ..... **Asystasia**
32b Stamens 2:
35a Anthers monothecous in chasmogamous flowers:
36a Corolla tube considerably longer than upper lip ..... **Ruspolia**
36b Corolla tube shorter than or ± as long as upper lip ..... **Ruttya** (see also × **Ruttyruspolia**)
35b Anthers 2-thecous in chasmogamous flowers:
37a Corolla with lips much longer than tube, throat narrow; disc shallowly cupular ..... **Chorisochora**
37b Corolla with lips ± as long as or shorter than tube, throat wide:
38a Inflorescence with small bracts; calyx easily visible:
39a Corolla subregular, campanulate; no cleistogamous flowers present ..... **Mackaya**
39b Corolla 2-lipped, tubular below; often with cleistogamous flowers ..... **Pseuderanthemum**
38b Inflorescence with large bracts obscuring calyx:
40a Corolla thin-textured, lobes ± as long as or longer than tube, bright or pale blue; staminodes 0; pollen prolate, without pseudocolpi, yellow when fresh ..... **Megalochlamys**
40b Corolla thick-textured, lobes much shorter than tube, green, lilac or white; staminodes 2; pollen almost spheroidal, with pseudocolpi, white or pink when fresh ..... **Ecbolium**
31b Corolla resupinate; seeds less than 3 mm in diameter; stamens only 2 and staminodes 0; anther thecae superposed (except where monothecous); inflorescences axillary, variously reduced 'umbels' of condensed monochasia:
41a Anthers monothecous ..... **Hypoestes**
41b Anthers 2-thecous:
42a Capsules with inelastic placental bases ..... **Peristrophe**
42b Capsules with elastic placental bases ..... **Dicliptera**

Acanthopsis Harv. 7982000

Harvey: 28 (1842); Clarke: 33 (1901).

Acanthodium Delile in part: t. 33 (1813).

Shrublets or acaulescent perennials, usually densely leafy. **Leaves** usually spinous-toothed. **Inflorescence** terminal, spicate; spikes cylindric or globose; bracts spinous-toothed, sometimes with spines on upper surface, rarely with gland-tipped hairs; bracteoles 2, usually linear. **Calyx** irregular; lobes 4, adaxial lobes outermost, broadly ovate or elliptic, ribbed; lateral lobes smaller, lanceolate or linear; tube shorter than lobes. **Corolla** 1-lipped; lobes 5, usually quadrate, with the 2 laterals smallest; tube shorter than lobes, ± cylindric. **Androecium**: fertile stamens 4, arising in mouth of corolla tube; filaments stout; anthers monothecous; theca oblong, ciliate, muticous; staminodes 0. **Pollen** prolate, 3-colpate; surface with shallow reticulations. **Disc** annular. **Gynoecium**: ovary somewhat ellipsoid, with 1 or 2 ovules in each locule, with 2 large sessile glands at tip; style filiform; style branch 1; ventral lobe flattened. **Capsule** compressed, ovoid, estipitate, with inelastic placental bases. **Seeds** elliptic, with long, feathery, hygroscopic hairs over whole surface.

Species 8, sthn Afr., Namibia and mainly arid winter-rainfall areas in South Africa.

Adhatoda Mill. 8094020

Miller: [39] (1754); Manning & Getliffe Norris: 62 (1995a).

Perennial herbs with annual branches from woody rootstock. **Leaves** sessile or subsessile, mainly elliptic, entire. **Inflorescence** terminal, a thyrse composed of 1- or 2-flowered cymes; bracts and bracteoles present. **Calyx** regular; lobes 5; tube shorter than lobes. **Corolla** 2-lipped, hairy; upper lip very shortly bilobed or nearly entire, rugula distinct; lower lip 3-lobed, with middle one ovate and lateral ones oblong, with 2 cavities at base without; aestivation ascending; staminal channels present; tube subcampanulate, shorter than lobes. **Androecium**: fertile stamens 2, arising deep in corolla throat, exserted; filaments linear; anthers 2-thecous; thecae parallel, tailed; staminodes 0. **Pollen** prolate, 3-colporate, with pseudocolpi; surface reticulate. **Disc** cupular, with V-shaped slit, with 2 awns. **Gynoecium**: ovary with 1 or 2 ovules in each locule; style linear, running in rugula, exserted, hairy on lower portion; style branches 2, equal, very short, broader than long. **Capsule** stipitate, with inelastic placental bases. **Seed** surface rough and convolute or rugose. $x = 17$ (10) (aneuploids, polyploidy).

Species many, Old World tropics; 2 in sthn Afr., mainly KwaZulu-Natal and Eastern Cape.

Anisotes Nees 8096000

Nees von Esenbeck: 424 (1847); Baden: 65 (1995a).

Macrorungia C.B.Clarke: 254 (1900) in part.

Shrubs. **Leaves** opposite, entire. **Inflorescence** terminal, axillary or on short lateral shoots, spicate or thyrsoid; bracts small. **Calyx** regular, hairy; lobes 5; tube shorter than lobes. **Corolla** 2-lipped, red, hairy; lips long; upper lip entire or minutely lobed, rugula distinct; lower lip 3-lobed, with a distinct keel and 2 channels on lower surface; aestivation ascending; tube cylindric, shorter than lobes. **Androecium**: fertile stamens 2, arising near base

of corolla tube, exserted; filaments linear, sometimes adnate to corolla tube almost to mouth; anthers 2-thecous; thecae subparallel, muticous; staminodes 0. **Pollen** prolate, 2–4-colporate, with pseudocolpi; surface reticulate. **Disc** shallowly cupular. **Gynoecium**: ovary ovoid, with 2 ovules in each locule; style terete, running in rugula; style branches 2, equal, very short, broader than long. **Capsule** woody, oblong, stipitate, with inelastic placental bases. **Seeds** 4, planocompressed; surface rough and convolute or rugose.

Species 19, mostly Africa to Arabian Peninsula and Madagascar; 2 in sthn Afr., Northern Province.

Asystasia Blume 8007000

Blume: 796 (1826); Clarke: 41 (1901).

Herbs or shrubs. **Inflorescence** terminal or axillary, thyrses, monochasial cymes, spikes or solitary flowers in axils; bracts usually small; bracteoles minute or 0, rarely longer than calyx. **Calyx** regular, usually hairy; lobes 5; tube shorter than lobes. **Corolla** subregular or ± 2-lipped; lobes 5, ovate or oblong; aestivation ascending; rugula indistinct; tube longer than lobes, inflated upwards, curved, with oblique mouth. **Androecium**: fertile stamens 4, didynamous; filaments arising in pairs in corolla tube, usually included, linear; anthers 2-thecous; thecae parallel, muticous; staminodes 0. **Pollen** prolate, 3-colporate, with pseudocolpi; surface reticulate. **Disc** cupular. **Gynoecium**: ovary ovate or oblong, with 2 ovules in each locule; style terete, included, running in rugula; style branches 2, equal (occasionally unequal) or ventral lobe more developed, cylindriform, expanded or sometimes very short, broader than long. **Capsule** stalked, laterally flattened, slightly beaked, stipitate, with inelastic placental bases. **Seeds** laterally compressed, irregularly obovate, rimmed; surface rough and convolute or rugose. x = 13 (14) (aneuploids, polyploidy).

Species ± 70, Africa to East Indies and Australia; 8 in sthn Afr., Namibia, Botswana, Swaziland and northern and eastern provinces of South Africa.

Barleria L. 7973000

Linnaeus: 636 (1753); Obermeyer: 123 (1933); Meyer: 8 (1968).

Shrublets or suffrutices of variable habit. **Leaves** usually with 2 serial buds in their axils, upper bud producing a normal branch, an inflorescence or an inflorescence reduced to a spine system and lower bud producing a branch or a vegetative spine system. **Inflorescence** terminal or axillary, dichasial or monochasial cymes, thyrses or single flowers, sometimes congested; bracts and bracteoles sometimes spinous. **Calyx** irregular; with 4 lobes; outer lobes 2, large, abaxial one sometimes bifid; inner lobes lateral, small; lobes sometimes foliaceous, sometimes pungent. **Corolla** subregular or irregular, sometimes 2-lipped; lobes 4 or 5, obovate, sometimes unequal, often with one lobe much shorter than others; when 2-lipped the upper lip 4-lobed; aestivation quincuncial; tube longer than lobes. **Androecium**: fertile stamens 2 or 4; filaments long, often twisted and crossing over each other; anthers 2-thecous; thecae parallel, muticous; staminodes 0–3. **Pollen** spheroidal, 3-porate; surface with large reticulations. **Disc** deeply cupular, sometimes with 2 awns or sometimes produced on one side. **Gynoecium**: ovary with 1 or 2 ovules in each locule; style terete, exserted; style branches 1 or 2, equal or ventral lobe more developed, flattened, disciform, funnel-shaped or very short and broader than long. **Capsule** with or without beak, estipitate, with inelastic placental bases; beak solid or hollow. **Seeds** flat, with hygroscopic hairs over whole surface. x = 10 (16, 19) (aneuploids, polyploidy).

Species 250, cosmopolitan, mainly tropics; ± 60 in sthn Afr., widespread, but rare in winter-rainfall area.

Blepharis Juss. 7980000

Jussieu: 103 (1789); Obermeyer: 105 (1937); Meyer: 18 (1968).

Acanthodium Delile: t. 33 (1813) in part. *Blepharacanthus* Nees: 385 (1836).

Procumbent annual or perennial herbs or suffrutices. **Leaves** often in unequal pairs, sometimes spinous-toothed. **Inflorescence** terminal, spicate, decussate, or scorpioid cymes, sometimes reduced; bracts 8, usually spinous-toothed, accrescent; bracteoles resembling bracts, sometimes 0. **Calyx** irregular; lobes 4; anticous one emarginate, bifid or bispinose and posticous one larger; lateral lobes 2, small; tube shorter than lobes. **Corolla** 1-lipped; lip usually with reflexed hairs on both sides; lobes usually 3–5, variable, with laterals smaller than others or obsolete; aestivation imbricate; tube shorter than lobes, subcylindric, with ring of hairs in mouth. **Androecium**: fertile stamens 4, equal, arising in mouth of corolla tube; filaments terete, with those of anticous stamens flattened above and produced into a protuberance as long as or shorter than anthers; anthers monothecous; theca ciliate, muticous; staminodes 0. **Pollen** prolate, 3-colpate; surface with shallow reticulations. **Disc** annular or saucer-shaped. **Gynoecium**: ovary ± ellipsoid, with 1 or 2 ovules in each locule, with 2 glandular bodies or cap at apex; style linear; style branches 2, equal, very short, broader than long. **Capsule** estipitate, with inelastic placental bases. **Seeds** laterally compressed, ovate, with long, feathery, hygroscopic hairs over whole surface. x = 8, 10, 13, 14, 15, 17, 18, 23.

Species ± 80, Africa to East Indies, also Mediterranean; ± 45 in sthn Afr., widespread, but mostly in arid parts.

Chaetacanthus Nees 7941000

Nees von Esenbeck: 444 (1836); Clarke: 18 (1901).

Shrublets or herbs, with woody rootstock or stolons. **Leaves** entire. **Inflorescence** axillary, dichasial cymes; bracteoles 2, usually shorter than calyx. **Calyx** regular; lobes 5; tube longer than lobes. **Corolla** 2-lipped; upper lip 2-lobed, rugula indistinct; lower lip 3-lobed; lobes oblong, truncate or obtuse; aestivation contorted; tube longer than lobes, pubescent, campanulate above. **Androecium**: fertile stamens 2; filaments of stamens and staminodes didynamous, arising in pairs in corolla throat; slightly exserted, linear; anthers 2-thecous; thecae parallel, oblong or linear-oblong, muticous; staminodes 2 or 0. **Pollen** prolate, 3-colporate, with many pseudocolpi; pore lipped; surface pusticulate. **Disc** annular. **Gynoecium**: ovary oblong, with 2 ovules in each locule; style terete, slightly exserted, pubescent; style branch 1; ventral lobe cylindriform. **Capsule** lanceolate, estipitate, with inelastic placental bases. **Seeds** biconvex, with hygroscopic hairs over whole surface.

Species ± 3, sthn Afr., widespread, mainly in eastern parts. Could probably be united with *Dyschoriste* Nees.

Chorisochora Vollesen 8048010

Vollesen: 469 (1994a).

Angkalanthus in sense of A.Meeuse: t. 1227 (1956).

Shrubs or shrubby herbs. **Leaves** long-petiolate, ± entire. **Inflorescence** terminal thyrses; bracts imbricate or not; bracteoles 2. **Calyx** regular, 5-lobed; lobes linear; tube shorter than lobes. **Corolla** 2-lipped, 5-lobed, pu-

berulous outside; 2 lobes in upper lip fused; lower lip deeply 3-lobed, aestivation ascending; tube shorter than lobes, cylindric, slightly widened upwards. **Androecium**: fertile stamens 2, arising just inside tube, with short downwardly directed hairs; anthers 2-thecous, thecae oblong, parallel, muticous; staminodes 0. **Pollen** spheroidal, 3-colporate; surface reticulate. **Disc** shallowly cupular. **Gynoecium**: ovary with 1 or sometimes 2 ovules per locule; style with scattered hairs towards base or glabrous; style branches 2, equal, cylindriform, longer than broad. **Capsule** stipitate, slightly beaked, club-shaped, 2- or 3-seeded, placental bases inelastic. **Seeds** discoid, broadly elliptic to circular in outline, rimmed, surface rough.

Species 3; 2 on Socotra, 1 in sthn Afr.: *Chorisochora transvaalensis* (A.Meeuse) Vollesen, Northern Province and Mpumalanga.

Crabbea Harv. 7972000

Harvey: 26 (1842) name conserved; Clarke: 118 (1899); Clarke: 38 (1901).

Perennial herbs, sometimes with decumbent stems or acaulescent. **Leaves** entire to faintly crenate or toothed. **Inflorescence** terminal or axillary, dichasial cymes, congested, sometimes peduncled heads; bracts foliaceous, ovate, weakly spinescent on margins; lower bract large, sterile; bracteoles slender or 0. **Calyx** subregular; lobes 5, with one slightly longer than others or two laterals shorter than others; tube shorter than lobes. **Corolla** ± 2-lipped; upper lip 2-lobed, lower 3-lobed; lobes semiorbicular or obovate; aestivation quincuncial; tube longer than lobes, usually with 2 large gibbosities at base. **Androecium**: fertile stamens 4, didynamous; filaments arising in pairs in lower portion of corolla tube, linear; anthers 2-thecous; thecae parallel or subparallel, sometimes ciliate, muticous; staminodes 0. **Pollen** spheroidal, 3-porate; surface with large reticulations. **Disc** cupular, with V-shaped slit. **Gynoecium**: ovary with 2–4 ovules in each locule; style terete, articulated on ovary, included; style branch 1, ventral lobe expanded. **Capsule** ± cylindric, estipitate, with inelastic placental bases. **Seeds** flattened, with hygroscopic hairs over whole surface. $x = 6$ or 7 (1 report, polyploidy).

Species ± 12, Africa; 7 in sthn Afr., Namibia (Caprivi), Botswana, Swaziland, Lesotho and mainly northern and eastern provinces of South Africa.

Crossandra Salisb. 7985000

Salisbury: t. 12 (1805); Vollesen: 503 (1990); Vos & Edwards: 94 (1992).

Shrublets or acaulescent perennials. **Leaves** sometimes large and elliptic. **Inflorescence** terminal, spicate, often on long peduncles; bracts large, ovate, usually pubescent, sometimes papery; bracteoles as long as calyx. **Calyx** subirregular, often with stalked, glandular hairs; lobes 5, elliptic or lanceolate, with uppermost lobe broadest and often 2-toothed; tube shorter than lobes. **Corolla** 1-lipped; lip 5-lobed, lobes rotund; aestivation imbricate; tube longer than lobes, cylindric. **Androecium**: fertile stamens 4, arising in upper part of corolla tube, included; filaments linear, shorter than anthers; anthers monothecous; theca sometimes ciliate, muticous; staminodes 0. **Pollen** prolate (with squared ends), 3-colpate; surface foveolate. **Disc** annular. **Gynoecium**: ovary ellipsoid, with 2 ovules in each locule; style filamentous, included; style branches 2, equal, cylindriform. **Capsule** oblong-elliptic, estipitate, with inelastic placental bases. **Seeds** ovate, compressed, with hygroscopic scales over whole surface. $x = 19$ (10) (polyploidy).

Species ± 50, Africa, Arabian Peninsula, India, Madagascar; 4 in sthn Afr., Swaziland and mainly northern and eastern provinces of South Africa.

Dicliptera Juss. 8031000

Jussieu: 267 (1807) name conserved; Balkwill *et al.*: 1 (1996).

Herbs or suffrutices. **Leaves** petiolate, entire. **Inflorescence** axillary, umbel-like group of monochasial cymes; primary bracts foliaceous, secondary bracts linear-lanceolate or occasionally elliptic, tertiary bracts broadly obovate, elliptic, ovate or linear-lanceolate, quaternary bracts linear-lanceolate. **Calyx** regular; tube shorter than lobes; lobes 5, linear-lanceolate. **Corolla** 2-lipped, resupinate, hairy; lip in upper position 3-toothed or shortly 3-lobed, rugula indistinct; lip in lower position entire or emarginate; aestivation ascending; tube shorter than lobes, cylindric below, somewhat campanulate above. **Androecium**: fertile stamens 2, arising in corolla throat, exserted; filaments linear, thinly hairy; anthers 2-thecous; thecae superposed, muticous; staminodes 0. **Pollen** prolate, 3-colporate, with pseudocolpi; surface reticulate. **Disc** cupular, with V-shaped slit, with 2 awns. **Gynoecium**: ovary ellipsoid, with 2 ovules in each locule; style filiform, exserted; style branches 2, equal, cylindriform, longer than broad. **Capsule** ovoid, stipitate, with elastic placental bases. **Seeds** discoid; surface rough and tuberculate. $x = 13$ (10, 12) (high polyploidy).

Species ± 150, cosmopolitan in warm and tropical areas; 15 in sthn Afr., Namibia, Botswana, Swaziland, widespread in South Africa, mainly in northern and eastern provinces.

Duosperma Dayton 7940000

Dayton: 262 (1945); Meyer: 28 (1968).

Disperma C.B.Clarke: 79 (1899) not of J.F.Gmel.

Shrublets or shrubs, ± hairy. **Leaves** entire, crenate or toothed. **Inflorescence** axillary, dichasial cymes; bracts ± as long as calyx; bracteoles similar. **Calyx** regular, glandular, hairy; lobes 5, ovate, with posticous ones larger than others; tube shorter than lobes. **Corolla** ± 2-lipped; upper lip 3-lobed, transversely ribbed on palate and with stiff, reflexed hairs, rugula indistinct; lower lip 2-lobed; all lobes retuse; aestivation contorted; tube cylindric below, narrowly campanulate above, longer than lobes. **Androecium**: fertile stamens 4, didynamous; filaments arising in pairs in throat of corolla, slightly exserted, linear; anthers 2-thecous; thecae parallel, muticous; staminodes 0. **Pollen** prolate, 3-porate, with pseudocolpi; pore lipped; surface reticulate. **Disc** annular. **Gynoecium**: ovary with 1 or 2 ovules in each locule; style subterete, exserted, sparsely hairy; style branches 1 or 2; ventral lobe more developed, cylindriform. **Capsule** 2-seeded, obovoid-ellipsoid, much flattened, woody, shiny brown, estipitate, with inelastic placental bases. **Seeds** discoid, with hygroscopic hairs over whole surface.

Species 12, Africa; 2 in sthn Afr., Namibia, Botswana and Mpumalanga.

Duvernoia E.Mey. ex Nees 8055000

Nees von Esenbeck: 322 (1847); Manning & Getliffe Norris: 15 (1995b).

Shrubs or small trees. **Leaves** large, elliptic, entire or obscurely undulate-crenate. **Inflorescence** axillary, pedunculate thyrses; bracts and bracteoles small. **Calyx** regular, glabrous; lobes 5; tube longer than lobes, campanulate. **Corolla** 2-lipped, minutely pubescent; upper lip shortly 2-lobed, rugula distinct, staminal channels present; lower lip 3-lobed, with middle lobe oblong and others falcately oblong, with two gibbosities at base without; aestivation ascending; tube shorter than lobes, subcampanulate. **Androecium**: fertile stamens 2, arising

in mouth of corolla, exserted; filaments terete; anthers 2-thecous; thecae parallel, muticous; staminodes 0. **Pollen** prolate, 2-colporate, with pseudocolpi; surface reticulate. **Disc** deeply cupular, with V-shaped slit, with 2 awns. **Gynoecium**: ovary subglobose, with 2 ovules in each locule, densely hairy; style terete, running in rugula, exserted; style branches 2, equal, very short, broader than long. **Capsule** woody, club-shaped, tomentose, stipitate, with inelastic placental bases. **Seeds** semiorbicular, compressed; surface rough and convolute or rugose.

Species 2, Mozambique and sthn Afr.; both in Swaziland and eastern provinces of South Africa.

Dyschoriste Nees 7939000

Nees von Esenbeck: 75 (1832); Clarke: 71 (1899); Clarke: 15 (1901).

Calophanes D.Don in part: t. 181 (1833).

Suffrutices or shrublets. **Leaves** usually elliptic and entire. **Inflorescence** axillary, dichasial cymes or solitary flowers; bracteoles 2, shorter than calyx. **Calyx** regular, persistent; lobes 5; tube cylindric or narrowly campanulate, 5-ribbed, longer than lobes. **Corolla** 2-lipped, pubescent, upper lip 2-lobed, rugula indistinct; lower lip 3-lobed; lobes oblong; aestivation contorted; tube longer than lobes, ± cylindric below, campanulate above. **Androecium**: fertile stamens 4, didynamous, subsimilar, arising in pairs in throat of corolla tube or ± halfway down, exserted or included; filaments linear; anthers 2-thecous; thecae parallel, oblong, muticous; staminodes 0. **Pollen** prolate, 3-colporate, with many pseudocolpi; pore lipped; surface pusticulate. **Disc** annular, with projection perhaps representing a fifth stamen. **Gynoecium**: ovary elliptic, with 2 ovules in each locule; style terete, exserted, pubescent; style branch 1, ventral lobe flattened, or sometimes expanded, longer than broad. **Capsule** cylindric, estipitate, with inelastic placental bases. **Seeds** usually 4, compressed, orbicular, with hygroscopic hairs over whole surface or sometimes restricted to rim. $x = 10$ (polyploidy).

Species ± 65, cosmopolitan in tropical and warm areas; 11 in sthn Afr., Namibia, Botswana, Swaziland and mainly northern and eastern provinces of South Africa.

Ecbolium Kurz 8048000

Kurz: 75 (1871); Vollesen: 638 (1989).

Shrubs or undershrubs. **Leaves** entire. **Inflorescence** terminal, spicate; bracts ovate or obovate; bracteoles 2, linear. **Calyx** regular, hairy; lobes 5, somewhat unequal; tube shorter than lobes. **Corolla** 2-lipped; upper lip bifid or subentire; lower lip deeply 3-lobed, with lobes ovate or oblong; aestivation ascending; tube longer than lobes, cylindric or funnel-shaped. **Androecium**: fertile stamens 2, arising low down in corolla tube, exserted; filaments linear; anthers 2-thecous; thecae parallel, muticous; staminodes 2. **Pollen** spheroidal, 3-colporate, with pseudocolpi; surface reticulate. **Disc** shallowly cupular, sometimes with V-shaped slit, with 2 awns. **Gynoecium**: ovary with 1 or occasionally 2 ovules in each locule; style terete, somewhat exserted; style branches 2, equal, expanded and disciform. **Capsule** ovoid, stipitate, with inelastic placental bases. **Seeds** irregularly obovate, dorsiventral, rimmed, with hygroscopic glochidiate hairs sparse on central area. $x = 9$ (10) (polyploidy).

Species 22, Africa to India; 3 in sthn Afr., Namibia, Swaziland and eastern provinces of South Africa.

Elytraria Michx. 7908000

Michaux: 8 (1803) name conserved; Burkill & Clarke: 27 (1899).

Dwarf herbs. **Leaves** in basal rosette. **Inflorescence** terminal, simple or divided, narrow spikes, on slender bract-covered peduncles; bracts ovate, closely wrapped around peduncle, with membranous margin fringed with woolly hairs; bracteoles 2. **Calyx** subirregular; lobes 5; tube shorter than lobes. **Corolla** 2-lipped, with 1 lip shortly 2-lobed; lobes oblong or ovate, imbricate in bud; tube longer than lobes. **Androecium**: fertile stamens 2, arising in corolla throat; filaments short; anthers 2-thecous, with a terminal projection; thecae parallel, with minute tails or muticous; staminodes 0. **Pollen** spheroidal; 3-colpate; surface with shallow reticulations. **Disc** annular. **Gynoecium**: ovary ± ellipsoid, with several ovules in each locule; style linear; style branches 2, equal, cylindriform. **Capsule** slightly beaked, estipitate; with inelastic placental bases; retinacula 0. **Seeds** minute, ovoid, reticulate, minutely papillose. $x = 11$, 12 (10, 23) (polyploidy).

Species ± 7, Africa, Asia and America; 1 in sthn Afr.: *Elytraria acaulis* (L.f.) Lindau, Botswana and Northern Province.

Glossochilus Nees 7970000

Nees von Esenbeck: 83 (1847); Clarke: 40 (1901).

Shrublets with tap root. **Leaves** linear to spatulate-linear, glabrescent. **Inflorescence** of solitary, axillary flowers; bracteoles 0. **Calyx** regular; lobes 5, linear, ciliate; tube shorter than lobes. **Corolla** 2-lipped, subregular, pubescent; upper lip 2-lobed with lobes oblong, rugula distinct; lower lip 3-lobed, with middle lobe ovate and with deep channel and transverse ridges, and lateral lobes oblong; aestivation ascending; tube longer than lobes, funnel-shaped, pilose within near base. **Androecium**: fertile stamens 4; filaments didynamous, arising in pairs on lower part of corolla tube, included, linear; anthers 2-thecous; thecae subparallel, muticous; staminodes 0. **Pollen** spheroidal, 2-colporate, with pseudocolpi; surface reticulate. **Disc** cupular, with projection perhaps representing a fifth stamen. **Gynoecium**: ovary with 2 ovules in each locule; style terete, pubescent near base; style branches 2, equal, cylindriform, or sometimes expanded. **Capsule** cylindric, stipitate, with inelastic placental bases. **Seeds** compressed, elliptic, rimmed, produced into blunt projection on one side, deeply concave on other, grooved on margin, surface rough.

Species 2, sthn Afr., Botswana and northern arid areas of South Africa.

Hygrophila R.Br. emend. Heine 7926000

Brown: 479 (1810); Heine: 171 (1962); Heine: 656 (1971).

Asteracantha Nees: 75 (1832). *Hemigraphis* Nees in part: 722 (1847).

Herbs, often glandular. **Leaves** linear to lanceolate or ovate, entire. **Inflorescence** axillary; dichasial cymes or solitary flowers; pedicels present or very short; bracts resembling leaves; bracteoles 0. **Calyx** lobes 4; subregular; tube shorter than lobes. **Corolla** 2-lipped, subregular or irregular; upper lip 2-lobed, with lobes recurved, sometimes bifid, rugula distinct; lower lip 3-lobed, with lobes strongly reflexed; aestivation imbricate; tube longer than lobes, cylindric below, widening above, sometimes somewhat saccate on widened portion. **Androecium**: fertile stamens 4; filaments didynamous, arising in pairs, usually broadly linear, sometimes with coarse setae, arising ± in middle of corolla tube or in mouth or on base of upper lip; anthers 2-thecous; thecae parallel, muticous; staminodes 0. **Disc** deeply cupular. **Gynoecium**: ovary oblong or linear-oblong, with 10–13 ovules in each locule; style terete-filiform, ± exserted, running in rugula; style branch 1; ventral lobe flattened. **Capsule** linear or linear-oblong, estipitate, with inelastic placental bases. **Pollen** prolate, 3-colporate, with many pseudocolpi; surface reticulate.

Seeds compressed, with hygroscopic hairs over whole surface. $x = 16$ (11, 17) (polyploidy).

Species ± 100, tropics generally; 9 in sthn Afr., N Namibia and Botswana, Swaziland and eastern provinces of South Africa.

Hypoestes Sol. ex R.Br. 8032000

Brown: 474 (1810); Balkwill & Getliffe Norris: 133 (1985).

Herbs or undershrubs. **Leaves** entire. **Inflorescence** axillary, umbel-like group of monochasial cymes, sometimes reduced; primary bracts foliaceous, secondary bracts linear-lanceolate, tertiary bracts obovate, elliptic, or narrowly lanceolate, free or united into a tube, quaternary bracts linear-lanceolate when present. **Calyx** regular; lobes 4 or 5, linear-lanceolate; tube shorter than lobes. **Corolla** 2-lipped, resupinate, hairy; lip in upper position 3-toothed or shortly 3-lobed, rugula indistinct; lip in lower position entire or emarginate; aestivation ascending; tube shorter than lobes, cylindric below, somewhat campanulate above. **Androecium**: fertile stamens 2, arising in corolla throat, exserted; filaments linear, thinly hairy; anthers monothecous; theca muticous; staminodes 0. **Pollen** prolate, 3-colporate, with pseudocolpi; surface reticulate. **Disc** cupular, with V-shaped slit, with 2 awns. **Gynoecium**: ovary ellipsoid, with 2 ovules in each locule; style filiform, exserted; style branches 2, equal, cylindriform, longer than broad. **Capsule** ovoid, stipitate. **Seeds** discoid; surface smooth or rough, with or without tubercles. $x = 10$ (aneuploids).

Species ± 40, Africa to Asia, East Indies and Australia; 3 in sthn Afr., Namibia, Botswana, Swaziland and mainly northern and eastern provinces of South Africa south to ± Still Bay (Western Cape).

Isoglossa Oerst. 8079000

Oersted: 155 (1854); Clarke: 79 (1901).

Robust herbs, undershrubs or shrubs with herbaceous branches, rarely woody. **Leaves** ovate or elliptic, usually petiolate. **Inflorescence** terminal or axillary, thyrsoid or spicate; bracts and bracteoles small, lanceolate or spatulate-obovate, sometimes enclosing calyx. **Calyx** regular, hairy or with stalked glands; lobes 5, lanceolate; tube shorter than lobes. **Corolla** 2-lipped, glabrous or hairy; upper lip shortly 2-lobed, rugula distinct; lower lip shortly 3-lobed, usually with a distinct keel on back and 2 raised ridges on palate; aestivation ascending; tube shorter than lobes, subcampanulate. **Androecium**: fertile stamens 2, arising near base of corolla tube or in upper cylindric portion, subexserted; filaments terete; anthers 2-thecous; thecae superposed and usually clearly separated with upper theca usually attached at right angles to filament, muticous; staminodes 0. **Pollen** spheroidal, 3-porate; surface reticulate. **Disc** annular, unusually large. **Gynoecium**: ovary with 1 or 2 ovules in each locule, ellipsoid; style terete, subexserted, or filiform and exserted, running in rugula; style branches 2, equal, very short, broader than long. **Capsule** ellipsoid, stipitate, with inelastic placental bases. **Seeds** ± quadrate, surface rough and convolute or rugose.

Species ± 50, Old World tropics; 15 in sthn Afr., Swaziland, Lesotho and mainly northern and eastern provinces of South Africa.

Justicia L. 8094000

Linnaeus: 15 (1753); Immelman: 18 (1995a).

Herbs or undershrubs. **Leaves** petiolate or sessile. **Inflorescence** terminal or axillary, thyrsoid, spicate, scorpioid cymes, dichasial cymes or raceme-like compound cymes; bracts and bracteoles variable. **Calyx** regular, with simple or stalked, glandular and/or eglandular hairs; tube shorter than lobes, with 4 or 5 lobes. **Corolla** 2-lipped, hairy or glandular; upper lip shortly 2-lobed or entire, rugula distinct; lower lip 3-lobed, with lobes ovate or oblong and usually pinnately ribbed on palate; aestivation ascending; tube shorter than lobes, subcampanulate or broadly cylindric. **Androecium**: fertile stamens 2, arising deep in corolla throat, slightly exserted; filaments linear, often hairy at base; anthers 2-thecous; thecae superposed, usually tailed, sometimes muticous; staminodes 0. **Pollen** prolate, 2- or 3-colporate, with pseudocolpi; surface reticulate. **Disc** deeply cupular; sometimes with V-shaped slit, with 2 awns (occasionally absent). **Gynoecium**: ovary ellipsoid or ovoid, with 2 ovules in each locule; style terete, running in rugula, subexserted; style branches 2, equal, very short, broader than long. **Capsule** ellipsoid or club-shaped, stipitate, with inelastic placental bases, occasionally hard, indehiscent capsule with single seed. **Seeds** usually orbicular; surface rough and convolute or rugose or rough and tuberculate or with long, barbed hairs. $x = 7, 9$ (8, 10, 11, 12, 13) (polyploidy, B-chromosomes).

Species ± 420, cosmopolitan in warm areas; 23 in sthn Afr., widespread, but not in Lesotho.

Lepidagathis Willd. 7971000

Willdenow: 400 (1800); Clarke: 120 (1899).

Perennial herbs or undershrubs. **Leaves** entire to faintly crenate. **Inflorescence** axillary, monochasial cymes, sometimes congested, sometimes somewhat spinescent; bracts present; bracteoles 0. **Calyx** subregular; lobes 5, unequal, usually with posticous one longer and broader than others and with lateral ones often pointed or spinescent; tube shorter than lobes. **Corolla** 2-lipped; upper lip ovate-oblong, emarginate, rugula distinct; lower lip 3-lobed, with 2 deep channels on outside; aestivation imbricate; tube longer than lobes, cylindric below, broadened above, often with stiff, deflexed hairs at top of cylindric part. **Androecium**: fertile stamens 4, didynamous; filaments arising in pairs ± in middle of corolla tube, slightly exserted, linear; anthers 2-thecous or rarely those of posticous stamens monothecous; thecae parallel, muticous; staminodes 0. **Pollen** prolate, 3-colporate, with pseudocolpi; surface with shallow reticulations. **Disc** annular. **Gynoecium**: ovary with (1)2 ovules in each locule, usually hairy at tip; style terete, slightly exserted, running in rugula; style branch 1, ventral lobe flattened and expanded. **Capsule** ovoid or elliptic, estipitate, with inelastic placental bases. **Seeds** ovoid or suborbicular, with hygroscopic hairs over whole surface. $x = 10, 11$ (12) (polyploidy).

Species ± 100, fairly cosmopolitan in warm and tropical areas; 2 in sthn Afr., Namibia, Botswana, Swaziland and northern and eastern provinces of South Africa.

Mackaya Harv. 8039000

Harvey: 8, t. 13 (1859); Clarke: 44 (1901).

Shrub. **Leaves** petiolate, elliptic or elliptic-lanceolate, acuminate, undulate-crenate. **Inflorescence** terminal, monochasial cymes; bracts 2, subulate; bracteoles 2. **Calyx** regular, hairy; lobes 5, linear-lanceolate, acuminate; tube shorter than lobes. **Corolla** subregular, lobes 5, ovate or oblong; aestivation ascending; tube longer than lobes, cylindric below, campanulate above. **Androecium**: fertile stamens 2, arising at base of campanulate part of corolla tube, ± included; filaments linear; anthers 2-thecous; thecae parallel, muticous; staminodes 2. **Pollen** spheroidal, 3-colporate, with pseudocolpi; surface reticulate. **Disc** annular. **Gynoecium**: ovary with 1 or 2 ovules in each locule; style terete, hairy or nearly glabrous below; style branches 2, equal, cylindriform. **Cap-**

sule woody, ellipsoid, long-stipitate, with inelastic placental bases. **Seeds** ± ovate, asymmetrical at base; surface rough and convolute or rugose. $x = 7$ or 12 (1 report, polyploidy).

Species 1: *Mackaya bella* Harv., Swaziland and northern and eastern provinces of South Africa.

Megalochlamys Lindau 8061000

Lindau: 345 (1899); Vollesen: 605 (1989).

Suffrutices or shrubs. **Leaves** entire, often with conspicuous linear cystoliths. **Inflorescence** terminal, spicate; bracts elliptic to ovate, sometimes large with cordate base; bracteoles 2, subulate. **Calyx** regular, scabrous or pubescent; lobes 5, linear or linear-lanceolate; tube shorter than lobes. **Corolla** 2-lipped; upper lip ovate-oblong, subentire; lower lip 3-fid; aestivation ascending; tube longer than lobes, cylindric. **Androecium**: fertile stamens 2, long-exserted; anthers 2-thecous; thecae parallel, muticous; staminodes 0. **Pollen** prolate, 3-colporate; surface reticulate. **Disc** cupular. **Gynoecium**: ovary occasionally with 1 or with 2 ovules in each locule, glabrous; style branches 2, equal, expanded. **Capsule** subglobose, stipitate, with inelastic placental bases. **Seeds** compressed, orbicular; surface smooth.

Species 10, Africa and Arabian Peninsula; 4 in sthn Afr., Namibia, Botswana and Northern Province.

Metarungia Baden 8030000

Baden: 638 (1984); Baden: 3 (1995b).

Macrorungia C.B.Clarke in part: 254 (1900).

Shrubs or subshrubs. **Leaves** sessile, subsessile or petiolate. **Inflorescence** terminal or axillary, strobilaceous thyrses or spicate; bracts sessile, imbricate, with hyaline, pale membranous margin. **Calyx** regular; lobes 5; tube shorter than lobes. **Corolla** 2-lipped, yellowish brown; upper lip continuing the tube, arched, emarginate, rugula distinct; lower lip narrowly obovate, 3-lobed; aestivation ascending; tube shorter than lobes, with 2 lateral evaginations from outside. **Androecium**: fertile stamens 2, arising at top of tube; filaments broadly linear; anthers 2-thecous; thecae subparallel, oblong, muticous; staminodes 0. **Pollen** prolate, 3-colporate, with pseudocolpi; surface reticulate. **Disc** cupular, with V-shaped slit and 2 awns. **Gynoecium**: ovary ovoid, with 2 ovules in each locule; style filiform, running in rugula; style branches 2, equal, expanded, very short, broader than long. **Capsule** woody, obovoid to oblongoid, stipitate, with elastic placental bases. **Seeds** compressed; surface rough and convolute or rugose.

Species 3, Africa; 2 in sthn Afr., Northern Province, Mpumalanga, Swaziland and Eastern Cape.

Monechma Hochst. 8094010

Hochstetter: 374 (1841); Munday: 47 (1995).

Herbs, undershrubs or shrubs. **Leaves** flat or rarely terete, entire, rarely with rudimentary teeth. **Inflorescence** axillary, reduced scorpioid cymes or flowers solitary; bracts and bracteoles usually small, rarely bracteoles 0. **Calyx** ± regular, usually with stalked, glandular hairs; lobes 4 or 5; tube shorter than lobes. **Corolla** 2-lipped, hairy; upper lip entire, truncate or emarginate, rugula distinct; lower lip 3-lobed with middle lobe pinnately ribbed; aestivation ascending; tube broadly cylindric, shorter than lobes; limb irregular. **Androecium**: fertile stamens 2, arising in mouth of corolla tube, ± included; filaments linear; anthers 2-thecous; thecae superposed, tailed or muticous; staminodes 0. **Pollen** prolate, 3-colporate, with pseudocolpi; surface reticulate. **Disc** deeply cupular, with V-shaped slit, with 2 awns. **Gynoecium**: ovary ± ellipsoid, with 1(2) ovules in each locule; style terete, running in rugula, included; style branches 2, equal, very short, broader than long. **Capsule** subglobose, 2-seeded or 1-seeded by abortion, stipitate, with inelastic placental bases. **Seeds** compressed, orbicular; surface smooth, sometimes speckled. $x = 11$ (1 report).

Species ± 40, mainly Africa, also India; 19 in sthn Afr., widespread, but not in Lesotho.

Nelsonia R.Br. 7909000

Brown: 480 (1810); Vollesen: 315 (1994b).

Diffuse, softly villous herb. **Leaves** elliptic, entire. **Inflorescence** terminal, ovate or cylindric spikes; bracts ovate, glandular, villous, closely imbricate; bracteoles 0. **Calyx** irregular; lobes 4, free almost to base; adaxial and abaxial lobes large, adaxial one often bifid; lateral lobes small, lanceolate. **Corolla** 2-lipped, small, purplish, rose or white; lobes 5, obtuse, spreading; tube slender, ± equal to lips. **Androecium**: fertile stamens 2, arising above middle of tube; anthers 2-thecous; thecae parallel, broadly elliptic and somewhat divergent, sometimes ciliate, with minute tail or muticous; staminodes 0. **Disc** annular. **Pollen** prolate, 3-colporate; surface foveolate. **Gynoecium**: ovary with 8–10 ovules in each locule; style branches 2; ventral lobe more developed, expanded. **Capsule** oblong, slightly beaked, bearing seeds from base, empty above, estipitate; with inelastic placental bases; retinacula 0. **Seeds** small, ellipsoid; surface convolute or rugose, with hygroscopic glochidiate hairs over whole surface. $x = 17$ (B-chromosomes).

Species 5, Africa, India, Australia, South America; 1 in sthn Afr.: *Nelsonia canescens* (Lam.) Spreng., Namibia (Caprivi) and N Botswana.

Neuracanthus Nees 7977000

Nees von Esenbeck: 76 (1832); Clarke: 137 (1899); Bidgood & Brummitt: 1 (1998).

Shrublets, sometimes with prostrate branches, usually with woody rootstock. **Leaves** entire to faintly toothed. **Inflorescence** axillary, spicate, dense, unilateral; bracts sometimes spinescent; bracteoles 0. **Calyx** irregular, 2-lipped, pilose; upper lip 3-fid; lower lip 2-fid; tube shorter than lobes. **Corolla** subregular; lobes 5, triangular; aestivation induplicate; tube longer than lobes, ± funnel-shaped, with reflexed hairs inside and outside. **Androecium**: fertile stamens 4, didynamous; filaments arising in pairs in upper part of corolla tube, scarcely longer than anthers, included, bifurcate; upper pair of anthers 2-thecous; lower pair monothecous or with rudimentary second theca; thecae parallel, ciliate, muticous; staminodes 0. **Pollen** spheroidal, 3-colporate; surface foveolate. **Disc** annular. **Gynoecium**: ovary oblong in outline, with 2, or occasionally 1, ovules in each locule; style terete, included; stigma with a single flattened lobe, longer than broad. **Capsule** ovoid, compressed, with beak, estipitate, with inelastic placental bases. **Seeds** discoid, with hygroscopic hairs over whole surface.

Species ± 20, Africa, Arabian Peninsula to India; 1 in sthn Afr.: *Neuracanthus africanus* S.Moore, Northern Province.

Peristrophe Nees 8026000

Nees von Esenbeck: 112 (1832); Clarke: 84 (1901); Balkwill: 83 (1996).

Herbs or subshrubs, sometimes scrambling or procumbent, and rooting at nodes. **Leaves** entire. **Inflorescence**

axillary, umbel-like group of monochasial cymes; primary bracts foliaceous, secondary bracts usually linear-lanceolate, tertiary bracts ovate, elliptic, or linear-lanceolate, quaternary bracts linear-lanceolate. **Calyx** regular; lobes 5, linear-lanceolate; tube shorter than lobes. **Corolla** 2-lipped, resupinate, hairy; upper lip 3-toothed or shortly 3-lobed, rugula indistinct; lower lip entire or emarginate; aestivation ascending; tube shorter than lobes, cylindric below, somewhat campanulate above. **Androecium**: fertile stamens 2, arising in corolla throat, exserted; filaments linear, thinly hairy; anthers 2-thecous; thecae superposed, muticous; staminodes 0. **Pollen** prolate, 3-colporate, with pseudocolpi; surface reticulate. **Disc** cupular, with V-shaped slit, with 2 awns. **Gynoecium**: ovary ellipsoid, with 2 ovules in each locule; style filiform, exserted; style branches 2, equal, cylindriform, longer than broad. **Capsule** stipitate, with inelastic placental bases. **Seeds** discoid; surface rough and tuberculate. $x = 10$ (polyploidy).

Species ± 15, Africa to East Indies; 11 in sthn Afr., Namibia, Botswana and northern and eastern provinces of South Africa.

Petalidium Nees 7934000

Nees von Esenbeck: 75 (1832); Obermeyer: 151 (1936); Meyer: 50 (1968).

Pseudobarleria T.Anderson: 26 (1864).

Shrublets or procumbent, perennial herbs. **Leaves** varying from ovate to linear. **Inflorescence** axillary, scorpioid or dichasial cymes, with few to many flowers; lower bracts present or 0, ultimate 2 bracts large, enclosing calyx. **Calyx** regular, glandular; lobes 4 or 5, when 4 then anticous one usually bifid or 2-toothed and lateral ones smaller; tube shorter than lobes. **Corolla** ± 2-lipped; upper lip 2-lobed; lower lip 3-lobed, with palate transversely ribbed and furnished with retrorse hairs; lobes obovate, obtuse or emarginate; aestivation contorted; rugula indistinct; tube longer than lobes, straight or curved, usually cylindric below and campanulate above. **Androecium**: fertile stamens 4, didynamous, arising at ± middle of corolla tube, included; filaments arising in pairs, broadly linear; anthers 2-thecous; thecae parallel, muticous or mucronate at base; staminodes 0. **Pollen** prolate, 3-porate, with pseudocolpi; pore lipped; surface reticulate. **Disc** annular. **Gynoecium**: ovary with 2 ovules in each locule; style terete, pubescent; style branches 2, equal, cylindriform. **Capsule** estipitate, compressed, narrowed at base and apex, with elastic placental bases. **Seeds** orbicular, with hygroscopic hairs over whole surface. $x = 8$ (polyploidy).

Species ± 35, Africa to India; 28 in sthn Afr., mainly Namibia, Botswana and arid northern and western parts of South Africa.

Phaulopsis Willd. 7932000

Willdenow: 342 (1800) name and orthography conserved; Manktelow: 1 (1996).

Scrambling or erect. **Leaves**: usually leaves of each pair unequal. **Inflorescence** axillary, partially reduced dichasial cymes subtended by a foliaceous bract. **Calyx** irregular, 2-lipped; upper lip of 4 lobes and lower of 1 much enlarged lobe, glandular-hairy, persistent; tube shorter than lobes. **Corolla** ± 2-lipped; upper lip 2-lobed; lower 3-lobed; lobes oblong or spatulate; aestivation contorted; rugula indistinct; tube longer than lobes, curved. **Androecium**: fertile stamens 4, didynamous, arising ± at middle of corolla tube, included; filaments arising in pairs, linear; anthers 2-thecous; thecae parallel, muticous and sometimes mucronate at base; staminodes 0. **Pollen** prolate, 3-(col)porate, with pseudocolpi; pore lipped; surface reticulate. **Disc** annular, with projection that might represent a fifth stamen. **Gynoecium**: ovary ellipsoid, with 2 ovules in each locule; style terete, finely pilose; style branch 1; ventral lobe sometimes expanded. **Capsule** estipitate, with elastic placental bases. **Seeds** compressed orbicular, with hygroscopic hairs over whole surface. $x = 17$ (1 report).

Species ± 20, Africa to India; 3 in sthn Afr., N Namibia, Swaziland and northern and eastern provinces of South Africa.

Pseuderanthemum Radlk. 8024000

Radlkofer: 282 (1883); Milne-Redhead: 255 (1936); Edwards & Harrison: 187 (1998).

Undershrubs. **Leaves** shortly petiolate. **Inflorescence** terminal thyrses; bracts and bracteoles present. **Calyx** regular; lobes 5; tube shorter than lobes. **Corolla** 2-lipped; lobes 5, subequal; aestivation ascending; rugula indistinct; tube longer than lobes, long-cylindric; small, cleistogamous flowers usually present. **Androecium**: fertile stamens 2, arising in throat of corolla; filaments linear; anthers 2-thecous; thecae parallel, muticous; staminodes 2. **Pollen** prolate, 3-colporate, with pseudocolpi; surface reticulate. **Disc** shallowly cupular. **Gynoecium**: ovary oblong, with 2 ovules in each locule; style branches 2, equal (occasionally unequal); ventral lobe more developed, expanded. **Capsule** long-stipitate, with inelastic placental bases. **Seed** surface rough and convolute or rugose. $x = 7$ (polyploidy).

Species ± 60, cosmopolitan in tropics; 2 in sthn Afr., KwaZulu-Natal.

Rhinacanthus Nees 8054000

Nees von Esenbeck: 76 (1832); Balkwill: 11 (1995).

Herbs or suffrutices, often with ribbed branches. **Leaves** petiolate, entire or obscurely undulate-crenate. **Inflorescence** terminal, panicles or scorpioid cymes of monochasial cymes or thyrses; bracts and bracteoles small, linear. **Calyx** regular, hairy or with stalked glands; tube shorter than lobes; lobes 5, linear-lanceolate. **Corolla** 2-lipped, pilose; upper lip entire or emarginate, rugula distinct; lower lip 3-lobed; aestivation ascending; tube much longer than lobes, cylindric. **Androecium**: fertile stamens 2, arising in mouth of corolla, exserted; filaments linear; anthers 2-thecous; thecae superposed, muticous; staminodes 0. **Pollen** prolate, 3-colporate, with pseudocolpi; surface reticulate. **Disc** shallowly cupular, with V-shaped slit, sometimes with 2 awns. **Gynoecium**: ovary with 2 ovules in each locule, ± ellipsoid, hairy; style filiform, running in rugula, exserted; style branches 2, equal, cylindriform, longer than broad. **Capsule** oblong, hairy, stipitate, with inelastic placental bases. **Seeds** suborbicular or transversely oblong; surface rough and tuberculate. $x = 10$ (polyploidy).

Species ± 22, Africa to Asia; 3 in sthn Afr., N Namibia, Swaziland, northern and eastern provinces of South Africa.

Ruellia L. 7965000

Linnaeus: 634 (1753); Clarke: 11 (1901); Meyer: 63 (1968).

Dinteracanthus C.B.Clarke ex Schinz: 416 (1915).

Shrubs, undershrubs or herbs, with taproot or woody rootstock. **Leaves** entire or slightly crenate. **Inflorescence** terminal or axillary, thyrses, dichasial cymes or solitary flowers; bracteoles 2, spatulate-elliptic or narrowly oblong, ± as long as calyx. **Calyx** ± 2-lipped; with 2 segments free nearly to base and 3 teeth connate nearly to middle; tube shorter than lobes. **Corolla** regular, subregular or 2-lipped; lobes 5, obovate; aestivation contorted; tube longer than lobes, cylindric below. **An-**

droecium: fertile stamens 4, didynamous; filaments arising in pairs, ± in middle of corolla tube, slightly exserted, linear; anthers 2-thecous; thecae parallel, muticous; staminodes 0. **Pollen** spheroidal, 3-porate; surface with large reticulations. **Disc** annular. **Gynoecium**: ovary with 3–8 ovules in each locule; style terete; style branch 1; ventral lobe expanded. **Capsule** subcylindric, elliptic or clavate, usually perfecting more than 4 seeds, estipitate, with inelastic placental bases. **Seeds** compressed, discoid, with hygroscopic hairs restricted to rim; rest of surface smooth. $x = 17$ (11, 16).

Species ± 150, America, Africa, Asia and Australia; ± 15 in sthn Afr., Namibia, Botswana, Swaziland and widespread mainly in northern and eastern provinces of South Africa.

Ruelliopsis C.B.Clarke 7946000

Clarke: 59 (1899); Meyer: 65 (1968).

Shrublets; stems sometimes procumbent from woody rootstock and rooting at nodes. **Leaves** linear, entire, usually setose. **Inflorescence** axillary, dichasial cymes or solitary flowers; bracts linear, longer than calyx; bracteoles ± as long as calyx. **Calyx** subregular; lobes 5, linear, setose; tube shorter than lobes. **Corolla** subregular; lobes 5, obovate; aestivation contorted; tube longer than lobes, narrow, widening above. **Androecium**: fertile stamens 4, didynamous; filaments arising in pairs, in upper part of corolla tube, included; anthers 2-thecous; thecae parallel, muticous or spurred; staminodes 0. **Pollen** spheroidal, 3-porate, with many pseudocolpi; pore lipped; surface reticulate. **Disc** annular. **Gynoecium**: ovary with 1–4 ovules in each locule; style terete, slightly exserted; style branch 1, ventral lobe flattened, longer than broad. **Capsule** cylindric, estipitate, with inelastic placental bases. **Seeds** compressed, orbicular, with hygroscopic hairs over whole surface. $x = 17$ (16, 18).

Species 2 or 3, Africa; 2 in sthn Afr., Namibia, Botswana and mainly northern and western parts of South Africa.

Ruspolia Lindau 8022000

Lindau: 79 (1896); Milne-Redhead: 255 (1936).

Subshrubs. **Leaves** shortly petiolate. **Inflorescence** terminal thyrses; bracts and bracteoles present. **Calyx** regular, hairy, sometimes glandular; lobes 5; tube shorter than lobes. **Corolla** 2-lipped; lobes 5, oblong; aestivation ascending; tube much longer than lobes, cylindric, glandular. **Androecium**: fertile stamens 2; arising in throat of corolla, exserted; filaments linear; anthers monothecous; thecae muticous; staminodes 2. **Pollen** prolate, 3-colporate, with pseudocolpi; surface reticulate. **Disc** shallowly cupular. **Gynoecium**: ovary with 2 ovules in each locule; style filiform, exserted; style branches 2, equal, very short, broader than long. **Capsule** club-shaped, stipitate, with inelastic placental bases. **Seeds** semi-orbicular, compressed, with somewhat horny margin, smooth on outer surface, rough and convoluted or rugose on inner surface.

Species 4, Africa, Madagascar; 3 in sthn Afr., N Botswana and Northern Province of South Africa.

Ruttya Harv. 8063000

Harvey: 27 (1842); Clarke: 55 (1901).

Suffrutices or shrubs. **Leaves** petiolate, entire. **Inflorescence** terminal, thyrses; bracts and bracteoles small, linear. **Calyx** regular, glabrous; lobes 5, linear; tube shorter than lobes. **Corolla** 2-lipped, glabrous or nearly so; upper lip emarginate or deeply 2-lobed, rugula indistinct; lower lip 3-lobed; lobes oblong, ± as long as tube; aestivation ascending; tube narrowly campanulate. **Androecium**: fertile stamens 2, arising in mouth of corolla, exserted; filaments broadly linear; anthers monothecous; theca muticous; staminodes 2. **Pollen** spheroidal, 3-colporate, with pseudocolpi; surface reticulate. **Disc** saucer-shaped, unusually large, with a projection perhaps representing a fifth stamen. **Gynoecium**: ovary with 2 ovules in each locule; style terete, exserted, thinly hairy on lower part; style branches 2, equal, very short, broader than long. **Capsule** club-shaped, stipitate, with inelastic placental bases; stalk long. **Seeds** compressed, elliptic, dorsiventral, rimmed; surface smooth.

Species 3, Africa; 1 in sthn Afr.: *Ruttya ovata* Harv., Swaziland and northern and eastern provinces of South Africa.

× **Ruttyruspolia** A.Meeuse & De Wet 8063010

Meeuse & De Wet: 439 (1961).

The essential difference between *Ruttya* and *Ruspolia*, is a 2-lipped corolla in *Ruttya* with a short broad tube widening gradually to the throat and in *Ruspolia* a subequally 5-lobed corolla with a narrowly cylindric tube. Both the wild and artificial hybrids have most of the morphological characters of the *Ruspolia* parent.

Only from Soutpansberg (Northern Province), × *Ruttyruspolia 'Phyllis van Heerden'* A.Meeuse & De Wet.

Salpinctium T.J.Edwards 8007010

Edwards & Getliffe Norris: 6 (1989).

Erect perennial herbs; stems branching from base, glabrous to densely pubescent. **Leaves** usually petiolate, elliptic to trullate, with cordate or widely rounded bases, entire. **Inflorescence** terminal, rarely branched, spikes with 5–20 flowers in decussate pairs; bracts linear to very narrowly lanceolate; bracteoles minute, linear. **Calyx** regular, persistent; lobes 5, linear, glabrous or glandular-pubescent; tube shorter than lobes. **Corolla** 2-lipped; upper lip 2-lobed, rugula indistinct; lower lip longer and unequally 3-lobed and with a poorly developed palate and faint nectar guides; aestivation ascending; tube longer than lobes, linear, pubescent without, glabrous within. **Androecium**: fertile stamens 4, didynamous; filaments arising in pairs, glabrous; anthers 2-thecous; thecae subparallel, muticous; staminodes 0. **Pollen** spheroidal, 2-porate with processes associated with pores; pseudocolpi present; surface reticulate. **Disc** cupular. **Gynoecium**: ovary with 2 ovules in each locule, oblong, glabrous or pubescent; style branches 2, equal, cylindriform, longer than broad. **Capsule** stipitate, with inelastic placental bases. **Seeds** reniform or pyriform, laterally compressed; surface rough and tuberculate.

Species 3, sthn Afr., Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Sclerochiton Harv. 7978000

Harvey: 27 (1842); Hilliard & Burtt: 109 (1970); Vollesen: 1 (1991).

Subshrubs, sometimes diffuse and scrambling. **Leaves** ± anisophyllous, entire or rarely dentate. **Inflorescence** terminal, spicate, sometimes reduced; bracts ovate or 0; bracteoles 2, ovate, shorter than calyx. **Calyx** regular; lobes 5, sometimes unequal, sometimes chartaceous and ribbed, with 2 outer segments sometimes bifid at apex; tube shorter than lobes. **Corolla** 1-lipped; lobes 5, oblong; aestivation imbricate; tube shorter than lobes. **Androecium**: fertile stamens 4, equal or subequal, arising in middle of corolla tube, exserted; filaments broadly linear; anthers monothecous; theca ciliate, muticous;

staminodes 0. **Pollen** prolate, 3-colpate; surface with shallow reticulations. **Disc** annular. **Gynoecium**: ovary ellipsoid, swollen at base, with 1 or 2 ovules in each locule, with large sessile glands near tip; style linear, exserted; style branches 2, equal, cylindriform. **Capsule** woody, ellipsoid, estipitate, with inelastic placental bases. **Seeds** oblong, flattened, oblique at base, without hygroscopic hairs; surface rough and convolute or rugose. $x = 6$ or 7 (1 report, polyploidy).

Species ± 12, Africa: 6 in sthn Afr., Swaziland and northern and eastern provinces of South Africa.

Siphonoglossa Oerst. 8049000

Oersted: 159 (1854); Immelman: 6 (1995b).

Aulojusticia Lindau: 324 (1897).

Undershrubs or herbs. **Leaves** opposite, petiolate, entire. **Inflorescence** axillary, solitary flowers or dichasial cyme; bracts and bracteoles linear. **Calyx** regular, sparsely hairy; tube shorter than lobes, lobes 4 or 5, linear-lanceolate. **Corolla** 2-lipped, glabrous or hairy; upper lip linear-oblong, entire or 2-fid, rugula distinct; lower lip 3-lobed, with middle lobe ovate, and lateral lobes oblong; aestivation ascending; tube long, narrowly cylindric. **Androecium**: fertile stamens 2, arising in mouth or throat of corolla tube, exserted; filaments linear; anthers 2-thecous; thecae superposed, tailed or muticous; staminodes 0. **Pollen** prolate, 2-colporate, with pseudocolpi; surface reticulate. **Disc** deeply cupular, with V-shaped slit, with 2 awns. **Gynoecium**: ovary ± ellipsoid, with 2 ovules in each locule; style terete, long-filiform, running in rugula, exserted; style branches 1 or 2, ventral lobe more developed, cylindriform. **Capsule** oblong, slightly beaked, stipitate, with inelastic placental bases. **Seeds** obovate; surface rough and convolute or rugose. $x = 11$ (14) (polyploidy).

Species ± 8, Africa and America; 3 in sthn Afr., Swaziland and eastern provinces of South Africa south to ± Knysna (Western Cape).

Thunbergia Retz. 7914000

Retzius: 163 (1780) name conserved; Retief & Reyneke: 107 (1984).

Suberect, rambling, twining or scandent herbs or suffrutices. **Leaves** ovate to lanceolate, sometimes cordate or hastate. **Inflorescence** terminal, compound monochasial cymes or thyrses or of solitary, axillary flowers with long pedicels; bracts 2, large, elliptic or ovate, surrounding each flower and hiding calyx. **Calyx** regular, usually with a shallow tube with 10–18 linear teeth or rarely shallowly cupular with 5 broad lobes. **Corolla** regular or subregular; lobes 5, obovate, spreading, contorted in bud; tube much longer than lobes, usually cylindric at base, funnel-shaped above. **Androecium**: fertile stamens 4, didynamous (arising in pairs) or subdidynamous; arising in lower part of corolla tube, included; filaments broadly linear; anthers 2-thecous; thecae parallel, each apiculate or with 1 apiculus and 2-spurred at base, with connective usually produced into an appendage, ciliate, or covered with multicellular hairs, which are sometimes club-shaped; staminodes 0. **Pollen** spheroidal; 3-colpate, surface foveolate, pusticulate or spinose. **Disc** deeply cupular. **Gynoecium**: ovary with 2 ovules in each locule; style terete, included; stigma funnel-shaped, with 2 infolding lobes and a tuft of hairs on each lobe and with stalked glands or stigma of 2 unequal lobes, one above the other. **Fruit** a globose capsule, abruptly rostrate, estipitate, with inelastic placental bases; retinacula 0. **Seeds** thick, broadly elliptic, with a cavity or groove on one face and convex on the other; surface rugose and sometimes tuberculate. $x = 8$, 9 (7, 10) (high polyploidy).

Species ± 100, Old World tropics; 11 in sthn Afr., Namibia, Botswana, Swaziland and northern and eastern provinces of South Africa.

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Achariaceae

(Dilleniidae—Violales)

Compiled by R.H. Archer

Herbaceous climbers or shrubby or acaulescent herbs, monoecious, with or without tendrils. **Leaves** alternate or rosulate, simple, sometimes palmately lobed, crenate or serrate; with or without stipules. **Flowers** unisexual, regular, solitary or few, or shortly racemose, axillary; male flowers without rudiments of gynoecium, female flowers without rudimentary stamens or staminodes. **Calyx** 3–5-parted; sepals usually linear. **Corolla** sympetalous, 3- or 4-lobed; tube campanulate; petals as long as tube or shorter. **Stamens** 3–5; filaments arising at base or in throat of corolla tube; anthers 2-thecous, connective often broadly expanded; glands at base of corolla tube. **Ovary** superior, 1-locular, of 3–5 fused carpels, with 3–15 ovules on 3–5 parietal placentas; style 1, 3–5-lobed, with lobes sometimes 2-fid. **Fruit** a septicidal capsule, enclosed in persistent corolla. **Seeds** subglobose, pitted or tubercled, often arillate; embryo straight, cotyledons flat; endosperm present.

Genera 3, species 3, sthn Afr.; widespread but rarely common.

Harvey: 501 (1862) under Passifloreae; Killick: 128 (1976); Dahlgren & Van Wyk: 11 (1988).

Key to genera

1a Acaulescent perennial herbs with radical leaves ..... **Guthriea**
1b Herbaceous shrublets or climbers:
2a Male flowers in short racemes; corolla lobes ciliate, not winged; herbaceous climbers ..... **Ceratiosicyos**
2b Male flowers solitary or few together in axils; corolla lobes usually slightly winged or keeled; herbaceous shrublets..... **Acharia**

Acharia Thunb. 5375000

Thunberg: 14 (1794); Harvey: 501 (1862); Killick: 130 (1976).

Shrubby herbs. **Leaves** simple, petioled, deeply palmately lobed, toothed; stipules linear. **Flowers** solitary or few, cernuous. **Male flowers**: sepals 3 or 4, linear, recurved; corolla 3- or 4-lobed, pubescent, persistent, tube campanulate, lobes ± as long as tube, ovate, slightly winged or keeled; glands 3 or 4, ciliate, at base of corolla tube; stamens 3 or 4, free, anthers oblong, didymous; ovary absent. **Female flowers**: sepals 3 or 4, hairy, lanceolate, larger than in male flowers; corolla pubescent, larger than in male flowers; tube campanulate, winged; glands at base of corolla tube; ovary subsessile, somewhat compressed, with 3–5 ovules on 3–5 parietal placentas, pubescent; style about as long as ovary, 3–5-lobed. **Fruit** a capsule enclosed in persistent corolla, 3–5-valved, with persistent style. **Seeds** subglobose, pitted, narrowly winged (arillate) on one side, pubescent.

Monotypic: *Acharia tragodes* Thunb., endemic to sthn Afr., Northern Province, Mpumalanga, KwaZulu-Natal to Eastern Cape.

Ceratiosicyos Nees 5374000

Nees ab Esenbeck: 281 (1836); Harvey: 501 (1862); Marloth: 199 (1925); Killick: 128 (1976).

Slender, herbaceous climbers, with or without tendrils. **Leaves** usually palmately 5–7-lobed, with lobes acuminate and serrate, rarely simple, usually long-petioled. **Male flowers** in short racemes; sepals 4 or 5, linear, spreading; corolla 4- or 5-lobed, tube campanulate, lobes ± as long as tube, ovate-oblong, ciliate, cohering by cilia; stamens 5, arising at base of corolla tube, alternat-

ing with ellipsoid glands, adnate to corolla tube, filaments slightly dilated upwards, anthers oblong, cohering; ovary absent. **Female flowers** solitary; calyx rudimentary; corolla as for male; stamens absent; glands 5, linear, ± $^3/_4$ length of corolla tube; ovary shortly stalked, ± cylindric, with several ovules on 4 or 5 parietal placentas; styles 4, short, 2-lobed. **Fruit** a 4- or 5-valved, elongate, ribbed capsule. **Seeds** several, subglobose, narrowly winged above, tubercled.

Monotypic: *Ceratiosicyos laevis* (Thunb.) A.Meeuse, endemic to sthn Afr., Namibia, Northern Province, Mpumalanga, KwaZulu-Natal, Eastern and Western Cape.

Guthriea Bolus 5376000

Bolus: t. 1161 (1876); Killick: 132 (1976).

Acaulescent perennial herbs with a subhorizontal rhizome and fleshy roots. **Leaves** rosulate, simple, ovate or cordate, petiolate, discolorous, crenate. **Flowers** solitary, pedicelled. **Male flowers**: sepals 5, linear, almost as long as corolla and adnate to it for almost its whole length; corolla 5-lobed, profusely veined, tube deeply campanulate, lobes shorter than tube, reflexed; glands 5, fleshy, situated at base of corolla tube; stamens 5, filaments arising in throat of corolla, shorter than anthers, flattened, anthers didymous with broad connective, pectinate. **Female flowers**: sepals 4 or 5, linear, adnate to corolla for half their length; corolla 4- or 5-lobed, tube campanulate, lobes much shorter than tube, transversely oblong, erect; glands 4 or 5, fleshy, situated at base of corolla tube; ovary sessile, with 10–15 ovules on 4 or 5 parietal placentas; style broadly linear, 4- or 5-lobed. **Fruit** a 4- or 5-valved capsule, enclosed in persistent corolla. **Seeds** several, ellipsoid, arillate.

Monotypic: *Guthriea capensis* Bolus, endemic to sthn Afr., damp, mountainous situations, KwaZulu-Natal, Lesotho, NE Western and Eastern Cape.

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Aizoaceae

(Caryophyllidae—Caryophyllales)

Compiled by L.L. Dreyer & M. Jordaan

Annual or perennial herbs, undershrubs or sometimes shrubs. **Leaves** alternate, opposite or crowded, sometimes very small, simple and entire, sometimes somewhat succulent, epidermis mostly with bladder idioblasts; stipules 0 or represented by membranes at base of petiole (*Sesuvium, Trianthema, Zaleya*). **Flowers** regular, mostly bisexual, perigynous, (semi)epigynous or rarely hypogynous, solitary, in cymes, fascicles or pedunculate clusters, rarely a spike (*Tetragonia*). **Perianth** elements (3–)5(–8), usually basally united, internally petaloid, externally sepaloid. **Stamens** 5–many; filaments free or variously united, anthers tetrasporangiate, opening by longitudinal slits. **Ovary** inferior to superior, 2–many-locular, with 1–many styles, free or fused at base; ovules 1–many per locule, sometimes pendulous; placentation axile, basal or parietal. **Fruit** mostly a loculicidal, sometimes septicidal or circumscissile, sometimes hygrochastic capsule, sometimes a horn-shaped or winged nut. **Seeds** with or without aril, with short funicle in *Tetragonia* and *Tribulocarpus*; perisperm copious, true endosperm ± 0.

Genera 12, species ± 174, cosmopolitan, prominent in the tropics and subtropics of the southern hemisphere, with a centre of diversity in Africa; sthn Afr.: genera 10, species ± 120, widespread.

Rudolphi: 53 (1830); Sonder: 387 (1862); Pax & Hoffmann: 179 (1934); Phillips: 285 (1951); Adamson: 109 (1955); Adamson: 87 (1956); Adamson: 23 (1959a); Adamson: 29 (1959b); Adamson: 147 (1961); Jeffrey: 1 (1961); Friedrich: 1 (1967); Gonçalves: 322 (1970); Gonçalves: 508 (1978); Friedrich: 1 (1970); Bittrich & Hartmann: 250 (1988); Hartmann: 44 (1993); Gilbert: 111 (1993).

Controversy prevails around the delimitation of the Aizoaceae in a broad sense, with different authors favouring different interpretations. This is reflected in the references cited here for the Aizoaceae in a strict sense: Rudolphi: 53 (1830) (Aizoaceae); Sonder: 386 (1862) (Mesembryaceae); Phillips: 285 (1951) (Aizoaceae including Molluginaceae and Tetragoniaceae); Adamson: 109 (1955) (Aizoaceae); 88 (1956) (Aizoaceae); 11 (1958a) (Aizoaceae); 67 (1958b) (Aizoaceae); 23 (1959) (Aizoaceae); 17 (1960) (Molluginaceae); 125 (1961) (Aizoaceae); Jeffrey: 1 (1961) (Aizoaceae including Molluginaceae and Tetragoniaceae); Friedrich: 1 (1967) (Tetragoniaceae); 1 (1970) (Aizoaceae); Dyer: 77 (1975) (Aizoaceae including Molluginaceae and Gisekiaceae, excluding Mesembryanthemaceae); Gonçalves: 508 (1978) (Aizoaceae in strict sense, excluding Molluginaceae, Mesembryanthemaceae and Tetragoniaceae); Bittrich & Hartmann: 239 (1988) (Aizoaceae including Mesembryanthemaceae and Tetragoniaceae, excluding Molluginaceae and the genus *Gisekia*); Hartmann: 44 (1993) (Aizoaceae including Mesembryanthemaceae and Tetragoniaceae, excluding Molluginaceae and the genus *Gisekia*); Gilbert: 111 (1993) (Aizoaceae including Mesembryanthemaceae and Tetragoniaceae, excluding Molluginaceae and Gisekiaceae).

The Aizoaceae in a strict sense, as accepted here, includes the subfamilies Aizooideae, Sesuvioideae and Tetragonioideae recognised by Bittrich & Hartmann: 239 (1988). The families Mesembryanthemaceae, Molluginaceae and Gisekiaceae are recognised as separate families and are treated as such in this publication.

Classification of Aizoaceae (excl. Mesembryanthemaceae) [after Bittrich & Hartmann (1988) in part]

I. Subfamily AIZOOIDEAE (Fruit a loculicidal or septicidal capsule; aril absent; inflorescences of bisexual flowers only): *Acrosanthes, Aizoanthemum, Aizoon, Galenia, Plinthus*

II. Subfamily SESUVIOIDEAE (Fruit a circumscissile capsule; seed completely covered by an aril): *Sesuvium, Trianthema, Zaleya*

III. Subfamily TETRAGONIOIDEAE (Fruit a nut, winged or horned; aril absent; inflorescences often andromonoecious): *Tetragonia, Tribulocarpus*

Key to genera

1a Fruit indehiscent, a winged or horned nut; plants often andromonoecious:
2a Fruit derived from a single ovary, winged, ridged or horned; perianth with free or only basally connate lobes ..... **Tetragonia**
2b Fruit compound, derived from a complete inflorescence including the bracts and bracteoles, spiny; perianth connate for ± half its length ..... **Tribulocarpus**
1b Fruit a capsule; inflorescence of bisexual flowers only:
3a Capsule circumscissile; aril present, covering the seeds completely:
4a Operculum of capsule breaking into 2 parts; 4 seeds per fruit ..... **Zaleya**
4b Operculum of capsule breaking off in 1 piece; many seeds per fruit ..... **Sesuvium**
3b Capsule loculicidal or septicidal, often hygrochastic; seeds never arillate:
5a Ovary locules 1; placentation parietal ..... **Trianthema**
5b Ovary locules 2 or more; placentation basal or ovules pendulous:
6a Fruit with septa incomplete, locules 2 with a single basal ovule each ..... **Acrosanthes**
6a Fruit with septa complete, locules mostly more than 2; ovules pendulous:
7a Capsules 5–10-locular; with 2–many ovules in each locule; distinct expanding keels present:
8a Capsules depressed at apex, if not then valves with prominent rims ..... **Aizoon**
8b Capsule convex at apex, ± rounded ..... **Aizoanthemum**
7b Capsules 2–5-locular; 1 pendulous ovule in each locule; expanding tissue rudimentary to absent:
9a Stamens as many as perianth lobes ..... **Plinthus**
9b Stamens twice the number of the perianth lobes, in pairs alternating with the perianth lobes ..... **Galenia**

Acrosanthes Eckl. & Zeyh. 2400000

Ecklon & Zeyher: 288 (1837); Sonder: 471 (1862); Pax & Hoffmann: 194 (1934); Friedrich: 58 (1955); Adamson: 23 (1959a); Bond & Goldblatt: 132 (1984); Hartmann: 45 (1993).

Aizoon L. subgen. *Acrosanthes* D.Dietr.: 180 (1847).

Prostrate to sprawling perennial undershrubs, branching dichasial with one branch dominant; stems woody at base. **Leaves** opposite, ± fleshy, glabrous; stipules 0. **Inflorescence** on suppressed dichasial branches, seemingly lateral, probably on well-developed vegetative base. **Flowers** perigynous, bisexual, small, pedunculate, solitary at nodes. **Perianth** 5-lobed with dorsal appendages; tube short, turbinate; lobes somewhat fleshy. **Stamens** 8–many, sometimes in groups. **Ovary** superior, incompletely divided by basal septum into 2 locules, each with 1 basal ovule; stigmas 2, short. **Fruit** a xerochastic capsule, persisting in perianth tube. **Seeds** reniform to orbicular; testa rugose to tuberculate, sometimes with an aril.

Species 5, Africa; 5 in sthn Afr., Western Cape.

Aizoanthemum Dinter ex Friedrich 2401010

Dinter: 27 (1935); Friedrich: 339 (1957); Friedrich: 11 (1970); Hartmann: 44 (1993).

Aizoon L. subgen. *Aizoanthemum* (Dinter ex Friedrich) Adamson: 44 (1959b).

Annual, variably papillose, prostrate or ascending, much-branched herbs. **Leaves** alternate, densely papillose, sessile or petiolate, ± fleshy; stipules 0. **Flowers** perigynous, bisexual, solitary, terminal, often sessile in fork of branches. **Stamens** many; filaments connate, flattened towards base. **Ovary** superior, 5–10-locular, with 2–many pendulous ovules per locule. **Fruit** a capsule with rounded top, opening completely hygrochastically by long expanding keels reaching from centre of fruit to tip of valve. **Seeds** reniform, with concentric ridges, light to dark brown. $x = 8$ (1 report).

Species 3, Africa; 3 in sthn Afr., Namibia.

Aizoon L. 2401000

Linnaeus: 488 (1753); Linnaeus: 216 (1754); Sonder: 469 (1862); Adamson: 29 (1959b); Friedrich: 613 (1960); Friedrich: 13 (1970); Gonçalves: 509 (1978); Hartmann: 44 (1993); Gilbert: 112 (1993).

Perennial or annual herbs or undershrubs, all parts variably pubescent. **Leaves** alternate, rarely opposite, often crowded, petiolate or sessile, flat to cylindrical; stipules 0. **Inflorescence** mostly frondose. **Flowers** bisexual, often seemingly solitary or in axillary groups. **Perianth** 4- or 5-lobed; tube ± campanulate, sometimes short, often strigose; lobes valvate or imbricate, white inside, yellow or pink outside. **Stamens** few to many, arising from calyx throat, in groups alternating with calyx lobes; filaments filiform. **Ovary** superior, 4- or 5-locular, sometimes discoid, included in calyx tube, with 2–many pendulous ovules per locule. **Fruit** a capsule with central impression, somewhat corky or woody, expanding keels long or short, lifting valves only slightly. **Seeds** small, pear-shaped or reniform, on long funicle, with concentric ridges. $x = 8$.

Species ± 25, Mediterranean; 11 in sthn Afr., often introduced as weed into suitable climates, Namibia, Botswana, Swaziland, Free State, KwaZulu-Natal, Northern, Western and Eastern Cape.

Galenia L. 2399000

Linnaeus: 359 (1753); Linnaeus: 169 (1754); Schellenberg: 500 (1913); Adamson: 87 (1956); Friedrich: 47 (1970); Bogle: 449 (1970); Bittrich: 217 (1990); Hartmann: 45 (1993).

Perennial shrublets or shrubs, rarely herbs, mostly branch-shedders, erect; branches woody at base, often forming dense mats, lateral branches alternate, secund, spreading. **Leaves** opposite or alternate, small, mostly obovate; stipules 0. **Inflorescence** often clearly separated from well-developed vegetative base. **Flowers** perigynous, bisexual, axillary, sessile or stalked, sometimes in terminal cymes, distal ones often with adnate bracts and bracteoles. **Perianth** 4- or 5-lobed; tube ± campanulate. **Stamens** 8–10, in alternisepalous pairs; filaments flat, tapering upwards; anthers small, yellow. **Ovary** superior, 2–5-locular, usually glandular; ovule solitary in each locule, pendulous, campylotropous; styles 2(–5), free or united below; stigmatic along inner surface. **Fruit** a small, weakly hygrochastic or xerochastic capsule. **Seeds** compressed, reniform to orbicular.

Species ± 30, Africa; ± 30 in sthn Afr., Namibia, Botswana, Free State and Northern Cape.

Plinthus Fenzl 2398000

Fenzl: 288 (1841); Sonder: 479 (1862); Schellenberg: 499 (1913); Pax & Hoffmann: 225 (1934); Verdoorn: 177 (1941); Adamson: 147 (1961); Friedrich: 91 (1970); Gonçalves: 511 (1978); Hartmann: 44 (1993).

Procumbent perennial subshrubs, younger plants with scale hairs. **Leaves** opposite or alternate, small, imbricate, ovate or ± 3-angled; stipules 0. **Inflorescence** of 1–

3 sessile flowers. **Flowers** perigynous, bisexual. **Perianth** 4- or 5-lobed; tube ± campanulate. **Stamens** 4 or 5, alternisepalous; filaments exserted or included. **Ovary** 2–4-locular, papillose or pubescent, with 1 pendulous ovule per locule; styles 2 or 3(4). **Fruit** a capsule with reduced expanding tissue. **Seeds** flat, subreniform, often ribbed, with elongated funicle.

Species 5 or 6, Africa; 5 or 6 in sthn Afr., Namibia, Botswana, Northern Province, Free State and Northern Cape.

Sesuvium L. 2394000

Linnaeus: 1058 (1759); Jeffrey: 235 (1960); Jeffrey: 20 (1961); Adamson: 244 (1962); Friedrich: 124 (1970); Bogle: 450 (1970); Gonçalves: 514 (1978); Hartmann: 45 (1993).

Diplochonium Fenzl: 461 (1862); Sonder: 473(1862).

Annual or perennial herbs or undershrubs, creeping to erect, succulent, glabrous; stems several from a short tap root, often reddish; branches rarely rooting. **Leaves** opposite to alternate, sessile or petiolate, succulent; stipules 0, but with membranes at base of petiole. **Flowers** bisexual, solitary, sessile or pedunculate, axillary, with 2 basal bracteoles. **Perianth** 5-lobed; lobes triangular, with long unifacial dorsal appendages. **Stamens** 5–many, free or connate at base, arising from mouth of calyx tube; filaments filiform or subulate; anthers small, often reddish. **Ovary** superior, 2–5-locular; ovules many per locule, anacampylotropous; placentation axile; styles 2–5, linear, erect; stigma longitudinal, papillose. **Fruit** a circumscissile membranous capsule, enclosed within persistent perianth with ± conical top. **Seeds** many, small, round to reniform, smooth, black, arillate; embryo annular; cotyledons oblong, fleshy; endosperm soft, starchy. $x = 8, 9$ (aneuploids, polyploidy).

Species ± 12, tropics and subtropics of both hemispheres, but mainly African, inhabiting saline sandy dunes and beaches, riverbeds, marshes; ± 4 in sthn Afr., Namibia, Botswana, Northern Province and Northern Cape.

Tetragonia L. 2403000

Linnaeus: 480 (1753); Linnaeus: 215 (1754); Fenzl: 460 (1862); Schellenberg: 502 (1913); Adamson: 110 (1955); Jeffrey: 32 (1961); Friedrich: 1 (1967); Bogle: 459 (1970); Gonçalves: 333 (1970); Gonçalves: 553 (1978); Gilbert: 116 (1993); Hartmann: 46 (1993).

Erect to prostrate, annual or perennial herbs or shrublets, rarely with tuber and annual shoots, often minutely papillose. **Leaves** alternate, subsucculent, often rhomboid; stipules 0. **Inflorescences** of 1–many, mostly axillary, rarely terminal flowers. **Flowers** bisexual or sometimes with male flowers terminating inflorescences. **Perianth** free, 3–5(–7)-lobed; tube produced above ovary, rarely connate at base. **Stamens** few to many, separate or fascicled. **Ovary** inferior or semi-inferior, (1–)3–8(9)-locular, with 1 pendulous ovule per locule; styles as many as locules, papillose. **Fruit** a nut, terete, winged, ridged, horned or spiny. **Seeds** solitary, subreniform with membranous testa, light brown; embryo hook- or horseshoe-shaped; cotyledons linear-oblong, fleshy; endosperm starchy. $x = 8$ (high polyploidy).

Species 50–60, Asia, Africa, Australia, New Zealand, temperate South America; ± 40 in sthn Afr., Namibia, Free State, Northern, Western and Eastern Cape.

This genus, together with *Tribulocarpus*, is sometimes placed in their own family Tetragoniaceae (Friedrich 1969b; Takhtajan 1997) on the basis of floral structure, the presence of a floral tube, many stamens, half-inferior to inferior ovaries and indehiscent fruits.

Trianthema L. 2395000

Linnaeus: 223 (1753); Linnaeus: 105 (1754); Sonder: 598 (1862); Jeffrey: 22 (1961); Friedrich: 131 (1970); Bogle: 453 (1970); Gonçalves: 517 (1978); Hartmann: 45 (1993).

Mostly succulent, annual herbs, rarely undershrubs, usually diffuse or prostrate. **Leaves** opposite, glabrous, papillose or hairy, with membranes or stipule-like lobes at base of petioles. **Flowers** bisexual, axillary, solitary or in fascicles, cymes or clusters, with 2 bracteoles each. **Perianth** 5-lobed; tube short or subelongated and campanulate; lobes small or large, with membranous margins, coloured within, dorsally mucronate. **Stamens** 5–many, sometimes unequal, separate or grouped, arising from base of calyx lobes; filament filiform; anthers small, rotund to oblong. **Ovary** superior, with 1 carpel, 1-locular; ovules 2–many, campylotropous; placentation basal or parietal; style 1(2), short; stigma longitudinal, papillate. **Fruit** a membranous or coriaceous capsule, transversely dehiscent. **Seeds** 1 or 2, round-reniform, arillate, reddish brown to black; embryo annular to coiled; cotyledons oblong, fleshy; endosperm starchy. $x = 7, 8, 13$ (polyploidy).

Species ± 17, cosmopolitan in the tropics and subtropics; 6 in sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga, Free State, KwaZulu-Natal and Northern Cape.

Tribulocarpus S.Moore 2403010

Moore: 228 (1921); Adamson: 148 (1955) as subgenus; Jeffrey: 34 (1961); Phillips: 294 (1951); Friedrich: 6 (1967); Gilbert: 116 (1993); Hartmann: 46 (1993).

Low shrublets. **Leaves** alternate; stipules 0. **Inflorescence** bracteolate, in terminal dense groups. **Flowers** bisexual or sometimes lateral ones male. **Perianth** 5-parted, connate for ± half its length; tube very short in male flowers. **Stamens** many, arising from mouth of perianth. **Ovary** inferior, of 2 fused carpels, 2-locular, with solitary, pendulous ovule per locule; style 1; stigmas 2. **Fruit** compound, fused to spinous bracts, spiny, stalked.

Species 1: *Tribulocarpus dimorphanthus* (Pax) S.Moore, Africa; Namibia.

The genus is separated from *Tetragonia* by the compound fruit which includes the sclerotinised bracts. The horns of some species of *Tetragonia* may, however, be of similar origin.

Zaleya Burm.f. 2395010

Burman: 110 (1768); Jeffrey: 235 (1960); Jeffrey: 236 (1961); Friedrich: 134 (1970); Gonçalves: 520 (1978); Hartmann: 45 (1993); Gilbert: 115 (1993).

Annual or perennial, prostrate to ascending herbs. **Leaves** opposite, petiolate, slightly succulent, with a membranous sheath at base of petiole; stipules 0. **Flowers** bisexual, sessile, in axillary clusters of 5–20. **Perianth** 5-lobed, connate in lower half; lobes with membranous margins, coloured within, dorsally mucronate. **Stamens** 5–15, free, arising from upper part of calyx tube. **Ovary** superior, 2-carpellate, syncarpous, 2-locular, with 2 ovules per locule, arising from interlocular septum; stigmas 2, free. **Fruit** a 4-seeded capsule; operculum splitting septicidally into 2 valves. **Seeds** reniform.

Species 6, NE and E Africa, Asia and Australia; 1 in sthn Afr.: *Zaleya pentandra* (L.) Jeffrey, Namibia, Botswana, Northern Province, North-West, Mpumalanga, Swaziland, N KwaZulu-Natal and Northern Cape.

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Amaranthaceae

(Caryophyllidae—Caryophyllales)

Compiled by M. Jordaan

Annual or perennial herbs or subshrubs, with Kranz anatomy. **Leaves** alternate or opposite, simple, entire or almost so; stipules 0. **Inflorescence** a dense head, a loose or dense spike-like thyrse, a spike, a raceme or a panicle, basically cymose, usually bracteate; bracts hyaline to membranous, stramineous to white, or coloured, subtending 1 or more flowers. **Flowers** bisexual or unisexual, sometimes sterile, mostly regular, small or minute, with 2–5 bracteoles, frequently in ultimate 3-flowered cymules; lateral flowers of such cymules sometimes sterile and modified into scales, straight or hooked spines, bristles, wings or hairs which serve as dispersal mechanism. **Perianth** uniseriate, membranous to firm and finally ± indurate, usually falling with ripe fruit included, with or without bracteoles at base. **Tepals** (0)1–3(–5), free or connate below, glabrous to ± pilose or lanate, equal or unequal, imbricate, green to white or variously coloured. **Stamens** 1–5, isomerous, opposite tepals, hypogynous, rarely perigynous; filaments frequently connate at base into a cup or tube, rarely free to base, some occasionally anantherous, sometimes alternating with variously shaped pseudostaminodes; anthers 1- or 2-thecous, dehiscing by 1 or 2 slits. **Ovary** superior, 2- or 3(4)-carpellate, free or adnate to perianth, 1-locular; ovules 1–many, erect to pendulous, placentation basal; style obsolete to long and slender; stigmas capitate to long and filiform, 1(2–5)-fid. **Fruit** an irregularly rupturing or circumscissile capsule, rarely a berry, usually with rather thin, membranous walls. **Seeds** globular to lenticular or ovoid, rarely arillate; testa shiny; embryo curved or circular; perisperm ± copious, true endosperm scanty.

Genera ± 69; species over 1 000, predominantly tropical, occurring mainly in Africa and America; sthn Afr.: genera 24, species 71. Family includes several cosmopolitan weeds and a large number of xerophytic plants; some are important vegetable or grain crops, and some are grown as decoratives.

Jussieu: 87 (1789); Brown: 417 (1810), as Amarantaceae; Martius: 207 (1826); Endlicher: 300 (1837); Moquin-Tandon: 231 (1849); Hooker: 20 (1880); Gilg: 152 (1897); Schinz: 91 (1893); Cooke & Wright: 402 (1910); Schinz: 7 (1934), as Amaranthaceae; Cronquist: (1981); Townsend: 1 (1985); Townsend: 28 (1988); Townsend: 70 (1993a); Townsend: 140 (1993b).

Classification of Amaranthaceae

I. Subfamily AMARANTHOIDEAE (Anthers 2-thecous):
  1. Tribe **Celosieae** (Ovary pluriovulate; leaves alternate): *Celosia, Hermbstaedtia*
  2. Tribe **Amarantheae** (Ovary uniovulate; leaves alternate or opposite):
    a. Subtribe **Amaranthinae** (Leaves alternate; seeds erect, radicle directed downwards): *Amaranthus*

b. Subtribe **Aervinae** (Leaves mostly opposite; seeds pendulous, radicle directed upwards): *Achyranthes, Achyropsis, Aerva, Arthraerua, Calicorema, Centema, Centrostachys, Cyathula, Kyphocarpa, Leucosphaera, Marcelliopsis, Nelsia, Nothosaerva, Pandiaka, Psilotrichum, Pupalia, Sericocoma, Sericorema*

II. Subfamily GOMPHRENOIDEAE (Anthers 1-thecous):

1. Tribe **Gomphreneae** (Ovary uniovulate; leaves opposite):
   a. Subtribe **Froelichinae** (Stigma capitate or shortly bilobed): **Alternanthera, *Guilleminea*
   b. Subtribe **Gomphreninae** (Stigmas 2(3)): **Gomphrena*

Key to genera

1a Leaves reduced to scales, or if developed, then fleshy or semisucculent; Namibia and Northern Cape:
2a Leaves alternate or occasionally opposite, often reduced to scales, or if developed then fleshy; branchlets twiggy, very shortly woolly ..... **Calicorema**
2b Leaves opposite, scale-like; opposite branches articulate; branchlets glabrous ..... **Arthraerua**
1b Leaves well developed, not fleshy; all regions of southern Africa:
3a Leaves alternate or fasciculate or sometimes opposite:
4a Modified sterile flowers present alongside fertile flowers, formed of wings, scales, spines, hairs or bristles; tepals pilose or floccose; stigma with a tuft of hairs:
5a Sterile flowers of strap-shaped processes furnished with long unicellular hairs, forming a silky-haired ball in fruit; tuft of hairs of stigma not purplish ..... **Sericorema**
5b Sterile flowers formed of long hairs and pilose spines; tuft of hairs of stigma purplish ..... **Marcelliopsis**
4b No modified sterile flowers present alongside fertile flowers; tepals pilose or glabrous; stigma without a tuft of hairs:
6a Ovaries with more than one ovule:
7a Stamens fused for at least half their length in a tube, either with large bifid intermediate pseudostaminodes, or with a sterile tooth on each side of antheriferous tooth or each filament widely expanded ..... **Hermbstaedtia**
7b Stamens not fused, pseudostaminodes 0 or small, filaments never widely expanded nor with a sterile tooth on each side of anther:
8a Inflorescences white-woolly; tepals dorsally densely lanate ..... **Aerva**
8b Inflorescences not white-woolly; tepals glabrous or pilose about the base only ..... **Celosia**
6b Ovaries uniovulate:
9a Flowers unisexual, male flowers situated towards apex of inflorescences or scattered among females, or plants dioecious; tepals glabrous; pseudostaminodes 0 ..... **Amaranthus**
9b Flowers bisexual, or if unisexual tepals ± hairy and pseudostaminodes present:
10a Leaves narrowly to broadly elliptic, elliptic-oblong or ovate; flowers minute, ± 1.25 mm long; stamens 1 or 2 ..... **Nothosaerva**
10b Leaves narrow, linear; flowers larger; stamens 5 ..... **Sericocoma**
3b Leaves opposite:
11a Bracteoles with a projecting dorsal keel along at least upper part of midrib ..... ***Gomphrena**
11b Bracteoles without dorsal keel along midrib:
12a Modified sterile flowers present, consisting of hairs, spines, bristles or scales, frequently on one side of sterile flower, sometimes concealed within bracteoles in flowering stage:
13a Stamens without intermediate pseudostaminodes:
14a Modified sterile flowers consisting of numerous uncinately hooked spines ..... **Pupalia**
14b Modified sterile flowers without hooked spines:
15a Inflorescence capitate; leaves narrowly or widely elliptic to lanceolate or ovate; densely canescent ..... **Leucosphaera**
15b Inflorescence spicate; leaves linear-acicular to narrowly oblong, glabrous ..... **Centema**
13b Stamens with intermediate pseudostaminodes:
16a Leaves narrowly linear; ovary asymmetrically horned at apex ..... **Kyphocarpa**
16b Leaves broadly linear or narrowly oblong, opposite sterile flowers of single rigid spines; ovary without an apical horn:
17a Sterile flowers of long plumose-pilose processes ..... **Nelsia**
17b Sterile flowers of spines or bracteoliform processes, never plumose-pilose ..... **Cyathula**
12b Modified sterile flowers 0, all flowers fertile:
18a Anthers 1-thecous; plants mainly prostrate or decumbent and diffusely branched:
19a Stamens perigynous; tepals densely woolly-lanuginose, 1-nerved, fused to ± halfway ..... ***Guilleminea**
19b Stamens hypogynous; tepals glabrous and 1-nerved or barbellate-pilose and 3-nerved, free:
20a Stigma capitate; flower clusters sessile in axils of leaves ..... ***Alternanthera**
20b Stigmas 2 or 3; flowers in dense spikes or terminal, sessile heads ..... ***Gomphrena**
18b Anthers 2-thecous; plants mainly erect:
21a Stamens 1 or 2; flowers minute, ± 1.25 mm long; leaves, branches and flower clusters varying from alternate to opposite ..... **Nothosaerva**
21b Stamens 4 or 5; flowers minute to larger; leaves and branches constantly alternate or opposite, or else flowers 4.5–6.0 mm long:
22a Pseudostaminodes absent between filaments ..... **Psilotrichum**
22b Pseudostaminodes present between filaments:

23a Robust aquatic or marsh perennial; upper tepal slightly longer than remainder with a sharper and often slightly recurved apex ..... **Centrostachys**

23b Plant not truly aquatic or paludal; upper tepal not thus differentiated:

24a Tepals glabrous, or floccose below the middle only:

25a Fruiting perianth strongly deflexed, closely appressed to inflorescence axis; bracteoles spinous aristate, arista longer than basal wings, or inflorescences fasciculate and formed of several spikes of diverse lengths ..... **Achyranthes**

25b Fruiting perianth not or less deflexed, not closely appressed to inflorescence axis; bracteoles frequently with midrib excurrent, but not long and spinose; inflorescence a solitary spike ..... **Achyropsis**

24b Tepals pilose throughout ..... **Pandiaka**

Achyranthes L. 2328000

Linnaeus: 204 (1753); Linnaeus: 96 (1754); Brown: 417 (1810); Hooker: 35 (1880); Schinz: 112 (1893); Baker & Clarke: 62 (1909); Cooke & Wright: 427 (1910); Adamson: 361 (1950); Bullock: 73 (1957); Cavaco: 302 (1958); Cavaco: 114 (1962); Podlech: 4 (1966); Henderson & Anderson: 102 (1966); Townsend: 145 (1973); Townsend: 473 (1974); Townsend: 100 (1985); Townsend: 105 (1988); Townsend: 163 (1993a); Townsend: 87 (1993b).

Erect perennial herbs, sometimes bushy or scandent, sometimes flowering in first year. **Leaves** opposite, entire, petiolate. **Inflorescence** a ± slender, simple or branched, elongated solitary or fasciculate spike up to 0.3 m long, terminal on stem and branches, flowers at first congested and ± patent, finally usually laxer and deflexed; bracts deltoid, ovate or acuminate, midrib excurrent in a spine, deflexed in fruit, persistent. **Flowers** bisexual, solitary in axils of bracts; bracteoles 2, spinous-aristate with excurrent midrib, lamina forming short and free to longer and adnate membranous wings; entire flower with bracteoles falling with ripening of seed. **Tepals** 4 or 5, 1–3(–5)-nerved, narrowly lanceolate, acuminate, mucronate with excurrent midrib, indurated in fruit especially at base. **Stamens** 2–5; filaments filiform, monadelphous at base, alternating with usually fringed pseudostaminodes; anthers 2-thecous. **Ovary** turbinate or obovoid; ovule solitary from apex of an elongated basal funicle; style cylindrical, variable in length; stigma capitellate. **Capsule** thin-walled, indehiscent. **Seed** cylindrical; perisperm/endosperm copious. $x = 7$ (aneuploids, high polyploidy).

Species 6–8, warm temperate and tropical regions of the Old World; 1 in sthn Afr.: *Achyranthes aspera* L. with 3 varieties, widespread and very variable in robustness.

Achyropsis (Moq.) Hook.f. 2328020

Hooker: 36 (1880); Baker & Clarke: 66 (1909); Cooke & Wright: 429 (1910); Cavaco: 100 (1960); Townsend: 430 (1979a); Townsend: 108 (1985); Townsend: 110 (1988); Townsend: 87 (1993b).

Achyranthes L. sect. *Achyropsis* Moq.: 310 (1849).

Annual or perennial herbs or subshrubs, trichotomously branched. **Leaves** opposite or fascicled, entire, sessile or shortly petiolate. **Inflorescences** subcapitate to spicate, terminal on stem and branches, bracteate; bracts persistent, finally weakly deflexed or deflexed-ascending. **Flowers** bisexual, small, solitary in axils of bracts, modified sterile flowers 0; bracteoles 2, closely appressed to tepals; bracteoles and perianth falling together with fruit. **Tepals** 4 or 5, glabrous or pubescent, shiny, firm, deeply concave and often cucullate above, 1–3-nerved, with midrib not or scarcely excurrent in a minute mucro. **Stamens** 4 or 5; filaments delicate, shortly monadelphous at base, alternating with small simple or fringed pseudostaminodes; anthers 2-thecous. **Ovary** ovoid, glabrous; ovule solitary, suspended from a long, basal funicle; style cylindrical, very short to slender; stigma capitellate. **Capsule** thin-walled, indehiscent, enclosed in base of perianth. **Seed** ovoid or lenticular; perisperm/endosperm copious.

Species 6, tropical and sthn Afr.; 2 in sthn Afr., Botswana, the northern provinces, Swaziland to KwaZulu-Natal and Eastern Cape.

Aerva Forssk. 2317000

Forsskål: 170 (1775) name conserved; Schinz: 108 (1893); Baker & Clarke: 37 (1909); Cooke & Wright: 425 (1910); Schinz: 52 (1934); Cavaco: 103 (1962); Townsend: 461 (1974); Townsend: 83 (1985); Townsend: 93 (1988); Townsend: 161 (1993a); Townsend: 85 (1993b).

Ouret Adans.: 268, 586 (1763).

Perennial herbs (sometimes flowering in first year), prostrate to erect or scandent. **Leaves** opposite or alternate, entire, flat. **Inflorescences** axillary and terminal, sessile or pedunculate, woolly spikes, or spikes arranged in a loose panicle, bracteate. **Flowers** unisexual or bisexual, plants probably sometimes polygamous, solitary in axils of bracts; bracteoles 2; bracteoles and perianth falling together with fruit but bracts and bracteoles persistent. **Tepals** 5, free, oval, or lanceolate-oblong, sometimes unequal, some or all softly woolly, with membranous margin and a thin to wider green centre. **Stamens** (and subulate staminodes of female flowers) 5; filaments connate at base into a basin or cup, alternating with subulate to oblong pseudostaminodes; anthers 2-thecous. **Ovary** small; ovule solitary, suspended from an elongated basal funicle; style shorter or longer than ovary; stigmas 2 or capitellate. **Capsule** thin-wall, delicate, bursting irregularly, membranous, enclosed in perianth. **Seed** compressed-reniform, firm, black. $x = 7, 8, 9, 10, 11$ (polyploidy).

Species ± 10, warmer parts of Africa and Asia; 3 in sthn Afr., widespread, but absent from KwaZulu-Natal and southern Cape region.

***Alternanthera** Forssk. 2335000

Forsskål: 28 (1775); Brown: 416 (1810); Hooker: 38 (1880); Schinz: 115 (1893); Baker & Clarke: 72 (1909); Cooke & Wright: 431 (1910); Schinz: 71 (1934); Adamson: 362 (1950); Podlech: 5 (1966); Townsend: 121 (1985); Townsend: 124 (1988); Townsend: 166 (1993a); Townsend: 89 (1993b).

Telanthera Moq.: 362 (1849); Hooker: 38 (1880); Henderson & Anderson: 104 (1966).

Annual or perennial herbs, sometimes becoming woody at base, prostrate or erect to floating or scrambling. **Leaves** opposite, entire. **Inflorescences** heads or short spikes, axillary, sessile or pedunculate, solitary or fasciculate, bracteate; bracts persistent. **Flowers** bisexual, solitary in axils of bracts; bracteoles 2, usually shorter than perianth, persistent or not; perianth falling with fruit. **Tepals** 4 or 5, free or concrescent at base, similar to very dissimilar, glabrous or furnished with smooth or denticulate hairs. **Stamens** 2–5, some occasionally anantherous, hypogynous; filaments monadelphous at base into a cup or tube, alternating with large and laciniate to small pseudostaminodes or these rarely obsolete; anthers 1-thecous. **Ovary** suborbicular or obovate in outline, usually compressed; ovule solitary, pendulous, basal; style short or absent; stigma capitellate. **Capsule** thin-

walled or sometimes corky, indehiscent. **Seeds** ± lenticular. $x = 17$ (7, 8, 9, 10) (high polyploidy).

Species ± 100, best represented in the New World tropics and subtropics; 4 introduced into sthn Afr., naturalised, widespread.

Amaranthus L. 2299000

Linnaeus: 989 (1753); Linnaeus: 427 (1754); Brown: 414 (1810); Hooker: 28 (1880); Schinz: 102 (1893); Baker & Clarke: 30 (1909); Cooke & Wright: 408 (1910); Adamson: 191 (1936); Adamson: 360 (1950); Aellen: 465 (1959); Aellen: 109 (1964); Podlech: 8 (1966); Townsend: 471 (1974); Townsend: 63 (1977); Brenan: 451 (1981); Townsend: 20 (1985); Townsend: 45 (1988); Townsend: 143 (1993a); Townsend: 81 (1993b).

Annual or rarely perennial herbs, erect or decumbent, glabrous or furnished with short and gland-like or multicellular hairs; plants monoecious or dioecious. **Leaves** alternate, simple, entire or sinuate, long-petiolate. **Inflorescences** basically cymose, of dense to lax axillary thyrses or upper clusters dense, leafless, aggregated and spike-like, bracteate. **Flowers** unisexual or bisexual; bracteoles 2–5, small and herbaceous or membranous and spinescent. **Tepals** (1–3)5, glabrous, membranous, equal or subequal, free or connate below and somewhat indurate, occasionally absent in flowers of dioecious spp. **Stamens** as many as tepals; filaments free at base; pseudostaminodes absent; anthers 2-thecous. **Ovary** ellipsoid, compressed; ovule solitary, subsessile, erect; style short or absent; stigmas 2 or 3, subulate or filiform. **Fruit** a dry capsule, usually enclosed in perianth, indehiscent or circumscissile, sometimes 2- or 3-toothed at apex. **Seed** globose or compressed, black, smooth and shiny; testa thin; embryo annular; endosperm present. $x = 17, 8$ (7, 9, 10, 12) (high polyploidy).

Species ± 60, tropical and warm temperate regions of both Old and New World, sporadic as weeds in cooler temperate areas; 15 native and introduced in sthn Afr., mostly widespread weeds of cultivation. A difficult genus, complicated by the cultivation of some species (e.g. *A. lividus* L. and *A. tricolor* L.) as green vegetables and others (especially *A. caudatus* L. and *A. hybridus* L. agg.) as grain crops. It is also a genus prone to hybridisation, though probably the frequency of natural hybrids has been overestimated.

Arthraerua (Kuntze) Schinz 2320000

Schinz: 109 (1893); Baker & Clarke: 71 (1909); Schinz: 50 (1934); Podlech: 10 (1966); Townsend: 85 (1993b).

Aerua Juss. sect. *Arthraerua* Kuntze: 272 (1886).

Low rounded semisucculent subshrubs, repeatedly branched; branches articulate, becoming striate. **Leaves** opposite, scale-like. **Inflorescences** small, dense, terminal, woolly spikes, bracteate. **Flowers** bisexual, solitary in axils of bracts. **Tepals** 5, free, 1-nerved, acuminate, scarious, silky. **Stamens** 5, free; quadrate pseudostaminodes fused to filaments; anthers 2-thecous, divergent at base. **Ovary** glabrous; ovules solitary on a basal funicle; style slender; stigma capitate. **Capsule** indehiscent, falling early with perianth.

Monotypic: *Arthraerua leubnitziae* (Kuntze) Schinz, confined to the west coast of Namibia.

Calicorema Hook.f. 2325000

Hooker: 34 (1880); Schinz: 545 (1912); Podlech: 10 (1966); Cooke & Wright: 427 (1910); Townsend: 86 (1993b).

Small, much-branched subshrubs, rigid and twiggy; young branches very shortly woolly. **Leaves** alternate or occasionally opposite, sometimes much reduced, fleshy. **Inflorescences** short to subcapitate spikes, bracteate. **Flowers** bisexual, solitary in axils of bracts; bracteoles 2. **Tepals** 5, free, stiffly membranous, subequal, with straight, silky hairs on back. **Stamens** 5; filaments fused to the quadrate to deltoid, fringed or entire pseudostaminodes; anthers 2-thecous. **Ovary** ovoid or turbinate, glabrous or downy; ovule solitary, suspended from an elongated basal funicle; style slender; stigma capitate. **Capsule** thin-walled, indehiscent.

Species 2, confined to sthn Afr., both in Namibia and Northern Cape.

Celosia L. 2292000

Linnaeus: 205 (1753); Linnaeus: 96 (1754); Hooker: 24 (1880); Schinz: 99 (1893); Schinz: 178 (1895); Schinz: 4 (1903); Baker & Clarke: 16 (1909); Cooke & Wright: 404 (1910); Schinz: 7 (1934); Meeuse: 145 (1961); Townsend: 1 (1975); Townsend: 30 (1988); Townsend: 141 (1993a); Townsend: 80 (1993b).

Annual or perennial herbs, sometimes rather woody at base, occasionally scandent. **Leaves** alternate, simple, entire or lobed. **Inflorescences** dense, terminal and axillary spikes, or in fascicles along floriferous branchlets, or more generally lax or compact terminal and axillary thyrses, bracteate. **Flowers** bisexual, small, white, silvery or rosy, sessile or shortly pedicellate; bracteoles 2. **Tepals** 5, free, all ± equal, glabrous or rarely somewhat pilose. **Stamens** 5; filaments expanded and fused into a cup below, free portions deltoid below and narrow above or ± swollen below; pseudostaminodes 0, rarely with minute, blunt intermediate teeth; anthers 2-thecous. **Ovary** ovoid to subglobose; ovules few to many, rarely solitary; style distinct and elongate to almost obsolete; stigmas 2 or 3, circular to filiform. **Capsule** membranous, circumscissile, sometimes thickened at apex. **Seeds** black, usually strongly compressed and shining, subcircular, reticulate, grooved, punctate or tuberculate, not arillate; endosperm present. $x = 9$ (7, 11) (high polyploidy).

Species ± 45, warmer regions of both Old and New World; 2 in sthn Afr., mainly in Namibia, Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Centema Hook.f. 2311000

Hooker: 31 (1880); Schinz: 107 (1893); Baker & Clarke: 55 (1909); Cooke & Wright: 418 (1910) in part; Schinz: 547 (1912); Schinz: 45 (1934); Townsend: 70 (1988); Townsend: 83 (1993b).

Erect perennial herbs or subshrubs; stems sometimes tuberculate. **Leaves** opposite, entire. **Inflorescences** pedunculate or sessile spike-like bracteate thyrses, each bract with a partial inflorescence of 1 or 2 bisexual flowers and 2 or 3 modified sterile flowers consisting of single very rapidly developing spines, partial inflorescence falling as a 2- or 3-spined burr. **Tepals** 5, inner becoming narrower, outer several-nerved, hardened at base, woolly on back. **Stamens** 5, unequal; filaments filiform, flattened, connate at extreme base; pseudostaminodes 0; anthers narrow, 2-thecous. **Ovary** ± compressed, glabrous; ovule solitary, basal; style slender, with 2 short or elongated stigma branches. **Capsule** scarcely compressed, delicate except for a small firm area about base of style, irregularly ruptured by developing seed, thin-walled, indehiscent. **Seed** ± horseshoe-shaped; perisperm/endosperm copious.

Species 2, southern tropical Africa; 1 in sthn Afr.: *Centema subfusca* (Moq.) Lopr., Northern Province, Swaziland and KwaZulu-Natal.

Centrostachys Wall. 2328030

Wallich: 497 (1824); Moquin-Tandon: 321 (1849); Baker & Clarke: 64 (1909); Schinz: 62 (1934); Cavaco: 124 (1962); Townsend: 472 (1974); Townsend: 105 (1985); Townsend: 109 (1988); Townsend: 87 (1993b).

Aquatic or subaquatic perennial herbs, prostrate to straggling or erect, usually much-branched, rooting particularly at lower nodes. **Leaves** opposite, entire, petiolate. **Inflorescence** a shortly pedunculate, elongate, bracteate spike, terminal on stem and branches; bracts

persistent, hyaline. **Flowers** bisexual, solitary in axils of bracts; bracteoles 2, ± circular, hyaline, falling with flower. **Tepals** 5, ± spreading at anthesis, later closing together and considerably indurate at base; upper tepal narrowest and longest, 1–3-nerved. **Stamens** 5, shorter than perianth, shortly monadelphous at base, alternating with spathulate pseudostaminodes furnished with fimbriate dorsal scales; anthers 2-thecous. **Ovary** oblong in outline; ovule solitary, pendulous on curved funicle, radicle ascending; style filiform; stigma capitate. **Capsule** thin-walled, tightly enclosing seed, falling together with persistent perianth and bracteoles. **Seed** smooth, chestnut-brown; perisperm/endosperm copious.

Monotypic: *Centrostachys aquatica* (R.Br.) Wall. ex Moq.; in tropical Asia from India and Sri Lanka to Indonesia and tropical Africa from Nigeria to Sudan and Ethiopia south to DRC, Tanzania, Zambia, Zimbabwe, Mozambique and sthn Afr. (Botswana).

Cyathula Blume 231200

Blume: 548 (1825) name conserved, not of Loureiro; Moquin-Tandon: 329 (1849); Baker & Clarke: 42 (1909); Cooke & Wright: 419 (1910); Schinz: 221 (1921); Schinz: 47 (1934); Cavaco: 87 (1962); Podlech: 15 (1966); Townsend: 74 (1977); Townsend: 55 (1985); Townsend: 79 (1988); Townsend: 152 (1993a); Townsend: 84 (1993b).

Annual or perennial herbs, sometimes woody at base, sometimes decumbent. **Leaves** opposite, entire, petiolate, sessile or subsessile, usually pubescent. **Inflorescences** terminal on stem and branches, spiciform or capitate, bracteate, ultimate division basically a triad of 1 central bisexual fertile and 2 modified sterile flowers formed of uncinate, straight or glochidiate spines or bracteoliform processes; bracts ovate, usually aristate, accompanied by 2 bracteoles, persistent, finally ± deflexed; bracteoles and perianth, all or part, falling as a burr in fruit. **Tepals** 5, free, subequal, very shortly mucronate or some hooked-aristate, often pilose. **Stamens** 5, shortly monadelphous at base; filaments linear, alternating with fringed pseudostaminodes; anthers 2-thecous. **Ovary** obovoid; ovule solitary, suspended from an elongated, basal funicle; style slender; stigma capitate. **Capsule** thin-walled, indehiscent, closely held in perianth. **Seed** ovoid, slightly compressed; perisperm/endosperm copious. $x = 17$ (7, 8) (polyploidy).

Species ± 25, tropics of both Old and New World; mostly Africa; 6 in sthn Afr., widespread, but less so in the Cape region.

*Gomphrena L. 2338000

Linnaeus: 224 (1753); Linnaeus: 105 (1754); Brown: 415 (1810); Hooker: 40 (1880); Schinz: 116 (1893); Baker & Clarke: 75 (1909); Cooke & Wright: 433 (1910); Adamson: 362 (1950); Cavaco: 165 (1962); Henderson & Anderson: 118 (1966); Podlech: 16 (1966); Townsend: 127 (1985); Townsend: 130 (1988); Townsend: 167 (1993a); Townsend: 89 (1993b).

Annual or occasionally perennial herbs, erect or prostrate, usually thickened at nodes, pubescent. **Leaves** opposite, sessile or subsessile, entire. **Inflorescences** terminal or axillary, capitate to spicate, sessile or pedunculate, solitary or glomerate, often subtended by a pair of sessile leaves, bracteate with bract persistent in fruit, axis frequently thickened. **Flowers** bisexual, solitary in axils of bracts; bracteoles 2, concave, or laterally compressed with a dorsal longitudinal keel or wing, or crested, falling with fruit. **Tepals** 5, erect, similar or dissimilar, free or almost so, ± lanate dorsally, at least inner 2 usually ± indurate at base in fruit. **Stamens** 5, hypogynous; filaments monadelphous, tube shortly 5-dentate with entire to very deeply bilobed teeth; with or without free pseudostaminodes; anthers 1-thecous. **Ovary** turbinate or subglobose; ovule solitary, pendulous; style short or long; stigmas 2 or 3, linear or short and thicker. **Capsule** a compressed, thin-walled, irregularly rupturing utricle. **Seed** compressed-ovoid, brown, smooth or faintly reticulate, shining. $x = 13$ (8, 9, 10, 11) (polyploidy).

Species ± 120, tropics and subtropics of the New World and in Australia, some introduced and naturalised in the Old World; 2 in sthn Afr., widespread weeds.

*Guilleminea Kunth 2330010

Kunth: 40, pl. 518 (1823) name emended; Mears: 137 (1967); Moquin-Tandon: 338 (1849); Schinz: 113 (1893); Townsend: 119 (1985); Townsend: 122 (1988); Townsend: 88 (1993b).

Gossypianthus Hook.: t. 251 (1840). *Brayulinea* Small: 394 (1903); Schinz: 64 (1934); Cavaco: 156 (1962); Henderson & Anderson: 14 (1966); Podlech: 9 (1966).

Prostrate or decumbent, mat-forming perennial herb with a thickened rootstock, pubescent. **Leaves** opposite, entire, ± elliptic, petiolate. **Inflorescences** sessile, axillary, dense, often fasciculate spikes, bracteate; bracts persistent, subequal, silvery, ± ovate. **Flowers** bisexual, minute, solitary in axils of bracts; bracteoles 2; perianth and bracteoles falling with fruit. **Tepals** 5, elliptic, oblong or ovate, acute, woolly at base, hyaline, or firm with 3 green nerves, free or connate to ± halfway; perianth and bracteoles falling with fruit. **Stamens** 5, perigynous; filaments fused into a tube, tube adnate to perianth; anthers 1-thecous. **Ovary** compressed; ovule solitary, pendulous; style usually short; stigma shortly bilobed. **Capsule** membranous, thin-walled, indehiscent. **Seed** compressed, firm.

Species 5, all natives of the Americas from southern USA to Argentina; 1 species: **Guilleminea densa* (Willd.) Moq., an increasingly widespread tropical weed, naturalised and widespread in sthn Afr.

Hermbstaedtia Rchb. 2293000

Reichenbach: 164 (1828); Moquin-Tandon: 246 (1849); Hooker: 25 (1880); Schinz: 100 (1893); Schinz: 8 (1903); Baker & Clarke: 24 (1909); Cooke & Wright: 405 (1910); Schinz: 229 (1911); Burtt Davy: 43 (1926); Schinz: 134 (1931); Schinz: 30 (1934); Meeuse: 145 (1961); Podlech: 12 (1966); Townsend: 82 (1982); Townsend: 39(1988); Townsend: 80 (1993b).

Berzelia Mart.: 292 (1826) not of Brongn.

Annual or perennial herbs, sometimes ± woody at base, never scandent. **Leaves** alternate, scattered, linear or spatulate-oblong, entire. **Inflorescences** dense to elongating, bracteate, terminal spikes or rarely in heads. **Flowers** bisexual, white, rosy or carmine to vermilion; bracteoles 2, persistent on fruit-fall. **Tepals** 5, equal or slightly dissimilar. **Stamens** 5, glabrous; filaments fused for at least half their length, alternating pseudostaminodes either free and bifid or adnate to adjoining filaments, which are then expanded almost to the tip and rounded or toothed on each side of anther; anthers 2-thecous. **Ovary** ovoid, narrowed into a style; ovules 2–20, erect; style long to very short; stigmas 2 or 3(–5). **Capsule** included in perianth, circumscissile. **Seeds** black, strongly compressed-lenticular and shiny, reticulate; endosperm present.

Species ± 15, confined to tropical and sthn Afr.; 11 in sthn Afr., widespread except in Cape region.

Kyphocarpa (Fenzl) Lopr. 2309000

Lopriore: 42 (1899); Baker & Clarke: 52 (1909) as *Cyphocarpa*; Cooke & Wright: 414 (1910); Podlech: 17 (1966); Townsend: 62 (1988); Townsend: 83 (1993b).

Sericocoma Fenzl sect. *Kyphocarpa* Fenzl: 323 (1843).

Erect annual herbs. **Leaves** opposite, entire, linear to oblong. **Inflorescences** elongate or subglobose, densely pilose spike-like thyrses terminal on stem and branches,

shortly or long-pedunculate or subtended by 1 or 2 reduced leaves; each bract subtending a bibracteolate partial inflorescence consisting mostly of a triad of a central bisexual flower and 2 lateral modified sterile flowers consisting of slender, finally spinous, processes; partial inflorescences falling as a unit complete with bracteoles; bracts persistent on inflorescence axis. **Tepals** 5, narrow, 3- or 5-nerved, free, oblong or oblong-lanceolate, mucronate, with broad, membranous margins, only a narrow central section coloured. **Stamens** 5; filaments fused into a cup at base, usually alternating with very short, blunt pseudostaminodes; anthers 2-thecous. **Ovary** scarcely compressed, considerably pilose above and with a distinct horn on one side below its apex; ovule solitary, suspended from a basal funicle; style simple; stigma capitate. **Capsule** ± compressed, irregularly ruptured below by developing seed, rounded apex densely pilose, gibbous to one side of style with a short horn-like process. **Seed** suborbicular; perisperm/endosperm copious.

Species probably 4, in south tropical and sthn Afr., widespread in warm, dry areas, Namibia, Botswana, the northern provinces, Free State, Swaziland, KwaZulu-Natal and Northern Cape.

Leucosphaera Gilg 2313000

Gilg: 152 (1897); Lopriore: 41 (1899); Schinz: 250 (1911); Schinz: 45 (1934); Townsend: 84 (1993b).

Marcellia Baill.: 625 (1886) in part; Baker & Clarke: 51 (1909) in part; Cooke & Wright: 413 (1910).

Small silvery shrublet. **Leaves** mostly opposite, entire. **Inflorescences** capitate, the ultimate divisions of 1 or 2 bisexual fertile flowers and 1 or 2 sterile flowers formed of 2–4 narrow, white, plumose-hairy bracteoliform processes. **Tepals** 5, obscurely 3-nerved, lanceolate-linear, with broad, membranous margins on lower half, long-acuminate, with minutely scabrid hairs; perianth of sterile flowers not spiny. **Stamens** 5; filaments abruptly expanded and connate into a cup below; pseudostaminodes 0; anthers 2-thecous. **Ovary** pyriform, densely pilose above; ovule solitary; style slender; stigma capitate. **Capsule** not compressed, thin-walled, apex firm, pilose, flat, hyaline wall glabrous and ruptured by developing seed, or indehiscent. **Seed** brown, shining, ± reticulate.

Monotypic: *Leucosphaera bainesii* (Hook.f.) Gilg, Angola, Namibia, Botswana and NW Northern Cape.

Marcelliopsis Schinz 2308000

Schinz: 48 (1934); Podlech: 18 (1966); Townsend: 84 (1993b).

Marcellia Baill.: 625 (1886) not of Choisy; Baker & Clarke: 49 (1909) in part. *Sericocoma* Fenzl subgen. *Newtonia* Schinz: 183 (1895).

Annual or perennial herbs or subshrubs. **Leaves** opposite or sometimes alternate, linear to oblong, entire. **Inflorescences** terminal, elongated, dense spiciform thyrses, bracteate; bracts subtending 2 bisexual flowers flattened at their point of contact and 2 modified lateral sterile flowers formed of long hairs and pilose spines. **Tepals** 5, oblong to linear, pilose. **Stamens** 5, free; filaments narrow, monadelphous at base; pseudostaminodes 0; anthers 2-thecous. **Ovary** woolly; ovule solitary, pendulous, basal; style columnar; stigma small, capitate with a tuft of purplish hairs. **Capsule** thin-walled, indehiscent. **Seed** orbicular, flattened.

Species 3, confined to Namibia.

Nelsia Schinz 2309020

Schinz: 247 (1911); Schinz: 44 (1934); Cavaco: 73 (1962); Podlech: 20 (1966); Townsend: 65 (1988); Townsend: 83 (1993b).

Sericocoma Fenzl subgen. *Eusericocoma* Schinz: 183 (1895).

Erect annual or perennial herbs. **Leaves** opposite on simple or branched stems, entire, subsessile. **Inflorescences** sessile or pedunculate, spike-like, densely silky-hairy, terminal or axillary bracteate thyrses; each bract subtending a bibracteolate partial inflorescence of usually 2 bisexual flowers accompanied by 1 or 2 lateral bracteolate triads of a central fertile flower subtended by 2 modified sterile flowers consisting of long, narrowly bracteoliform, plumose-pilose processes, some short and scale-like; the whole falling as a burr-like unit in fruit; bracts persistent on inflorescence axis. **Tepals** 5, narrow, linear-lanceolate, 3-nerved, pilose, mucronate, margin hyaline. **Stamens** 5; filaments filiform, delicate, connate below and with intermediate flabellate pseudostaminodes; anthers narrow, 2-thecous. **Ovary** ± compressed, glabrous; ovule solitary, from apex of a long basal funicle; style slender, stigma 1, minutely capitate. **Capsule** scarcely compressed, apex concave with a distinct raised rim, thin-walled, indehiscent. **Seed** brown, smooth and shining, finely reticulate; perisperm/endosperm copious.

Species 2; 1 in Angola and 1 in sthn Afr.: *Nelsia quadrangula* (Engl.) Schinz, Namibia and Botswana.

Nothosaerva Wight 2318000

Wight: 1 (1853); Hooker: 34 (1880); Schinz: 109 (1893); Schinz: 52 (1934); Cavaco: 104 (1962); Townsend: 88 (1985); Townsend: 97 (1988); Townsend: 161 (1993a); Townsend: 85 (1993b).

Annual herbs. **Leaves** opposite or alternate, entire. **Inflorescences** in dense, sessile, solitary or clustered spikes, or flowers solitary in axils of scarious bracts. **Flowers** bisexual, very small; bracteoles 2, very small. **Tepals** 3 or 4(5), free, hyaline, villous, with a green band, subtended by 2 very small bracteoles. **Stamens** 1 or 2; filaments filiform; intermediate pseudostaminodes 0; anthers 2-thecous. **Ovary** globose-ovoid; ovule solitary, pendulous, radicle ascending; style short; stigma capitate. **Capsule** delicate, irregularly rupturing. **Seed** rounded, compressed; perisperm/endosperm copious.

Monotypic: *Nothosaerva brachiata* (L.) Wight in Pakistan, India, Sri Lanka, Burma, Mauritius and tropical Africa from Senegal eastwards to Ethiopia and N Somalia southwards to sthn Afr., Northern Province and N KwaZulu-Natal.

Pandiaka (Moq.) Hook.f. 2328010

Hooker: 35 (1880); Baker & Clarke: 67 (1909); Schinz: 64 (1934); Cavaco: 138 (1962); Podlech: 20 (1966); Cavaco: 81 (1960); Townsend: 425 (1979a); Townsend: 112 (1985); Townsend: 115 (1988); Townsend: 87 (1993b).

Achyranthes L. sect. *Pandiaka* Moq.: 310 (1849). *Argyrostachys* Lopr.: 108 (1901).

Annual or perennial herbs with slender to tuberous rootstocks. **Leaves** opposite, entire, sessile or petiolate. **Inflorescence** spicate to capitate, lateral and terminal, elongating later or not; bracts 2, usually more than half as long as flowers, acute or ± spinescent, persistent, spreading or rarely deflexed. **Flowers** bisexual, solitary in axils of bracts; bracteoles 2, ± half as long as perianth or more, midrib excurrent in a short, glabrous and pungent, flexuose and pilose arista, lamina firm, chartaceous or horny. **Tepals** 5, lanceolate to oblong-lanceolate, feebly to strongly 1–3(5)-nerved, with straight white hairs or glabrescent, concrescent at base, ± mucronate to aristate with excurrent nerve, falling with ripe seed, accompanied by bracteoles or not. **Stamens** 5; filaments filiform, monadelphous below, alternating with mostly quadrate dentate or fimbriate pseudostaminodes; anthers 2-thecous. **Ovary** ovoid, glabrous; ovule solitary, on basal funicle; style linear; stigma small, capitate. **Capsule** oblong-obovoid, with a narrower firm apex, thin-walled, indehiscent. **Seed** oblong-ovoid, brown, shining, faintly reticulate.

Species ± 12, tropical and sthn Afr.; 1 in sthn Afr.: *Pandiaka carsonii* (Baker) C.B.Clarke var. *carsonii*, N Namibia.

Psilotrichum Blume 2324000

Blume: 544 (1825); Hooker: 32 (1880); Schinz: 110 (1893); Baker & Clarke: 57 (1909); Cooke & Wright: 424 (1910); Schinz: 60 (1934); Verdcourt: 489 (1964); Townsend: 90 (1985); Townsend: 101 (1988); Townsend: 87 (1993b).

Psilostachys Hochst.: 6, t. 4 (1844).

Perennial herbs or subshrubs, prostrate to erect or scandent, trichotomously branched. **Leaves** opposite or partly alternate, ovate or elliptic-lanceolate, entire. **Inflorescences** axillary and terminal, sessile to long-pedunculate, bracteate heads or spikes or broad, lax, panicles; bracts persistent, finally spreading or deflexed. **Flowers** bisexual, solitary in axils of bracts; bracteoles 2, falling with fruit. **Tepals** 5, free, inner 2 with broader hyaline margin than outer 2, with central intermediate, sometimes gibbous at base, usually pubescent on outer surface. **Stamens** 5, shortly monadelphous at base, without or rarely with small alternating pseudostaminodes; anthers 2-thecous. **Ovary** subglobose or oblong in outline; ovule solitary, suspended from a long, basal funicle; style slender but rather short; stigma bifid or capitate. **Capsule** thin-walled, indehiscent, enclosed in hardened base of perianth. **Seed** smooth, lenticular, brownish.

Species ± 18, mostly in tropical Africa, also in tropical Asia; 1 in sthn Afr.: *Psilotrichum sclerantlium* Thwaites (= *P. africanum* Oliv.), Northern Province and KwaZulu-Natal.

Pupalia Juss. 2314000

Jussieu: 132 (1803) name conserved; Hooker: 31 (1880); Schinz: 108 (1893); Baker & Clarke: 47 (1909); Cooke & Wright: 422 (1910); Schinz: 48 (1934); Townsend: 131 (1979b); Townsend: 73 (1985); Townsend: 88 (1988); Townsend: 84 (1993b).

Pupal Adans.: 268, 596 (1763).

Annual or perennial herbs or subshrubs, often trichotomously branched, sometimes scandent. **Leaves** opposite, broad, entire, petiolate. **Inflorescence** a spiciform bracteate thyrse, terminal on stem and branches, each bract subtending a partial inflorescence of 1–more fertile bisexual flowers which are subtended on each side by modified sterile flowers formed of 3–more stalked clusters of hooked spines; bracts persistent, finally ± deflexed, entire; partial inflorescence falling as a burr in fruit. **Tepals** 5, free, lanceolate, shortly mucronate, loosely woolly. **Stamens** 5; filaments linear, connate at base around ovary; pseudostaminodes 0; anthers 2-thecous. **Ovary** subglobose; ovule solitary, pendulous, basal; style slender; stigma capitate. **Capsule** thin-walled, irregularly ruptured below firm apex by developing seed. **Seed** oblong-ovoid or ovoid, black, slightly compressed; perisperm/endosperm copious. $x = 10$ (13) (high polyploidy).

Species 4, tropics of Old World from Africa to Malaysia and the Philippines; 2 in sthn Afr., Namibia, Botswana, the northern provinces, Swaziland, Free State, KwaZulu-Natal, Northern and Eastern Cape.

Sericocoma Fenzl 2305000

Fenzl: 33 (1842); Fenzl: 323 (1843); Hooker: 30 (1880); Schinz: 106 (1893); Schinz: 236 (1911) excluding *S. pungens*; Baker & Clarke: 41 (1909); Cooke & Wright: 416 (1910); Schinz: 43 (1934); Podlech: 21 (1966); Townsend: 82 (1993b).

Sericocoma Fenzl subgen. *Eurotia* Schinz: 183 (1895) in key, and subgen. *Eusericocoma* Schinz: 183 (1895), in part.

Glabrous or hairy herbs or subshrubs. **Leaves** opposite or partly alternate, linear, oblong or occasionally obovate, sessile, entire. **Inflorescences** terminal heads or spiciform, 1 or 2 flowers together with 1–more flowers reduced to spines, bracteate. **Flowers** all bisexual, solitary in axils of bracts; bracteoles 2, falling with fruit. **Tepals** 5, connate at base, coriaceous or chartaceous, ovate or oblong-lanceolate, long-pilose, subequal, outer not long-aristate. **Stamens** 5, shortly connate below; pseudostaminodes minute 0; anthers 2-thecous. **Ovary** ± ovoid, woolly or tomentose; ovule solitary, suspended from apex of elongated funicle; style slender; stigma capitate. **Capsule** thin-walled, included in perianth, membranous, indehiscent. **Seed** compressed; embryo annular.

Species 3, confined to sthn Afr., dry parts of Namibia, Northern, Western and Eastern Cape.

Sericorema (Hook.f.) Lopr. 2307000

Lopriore: 39 (1899); Cooke & Wright: 412 (1910); Schinz: 244 (1911); Schinz: 44 (1934); Townsend: 6770 (1988); Townsend: 83 (1993b).

Sericocoma Fenzl sect. *Sericorema* Hook.f.: 30 (1880). *Sericocoma* Fenzl subgen. *Sericorema* (Hook.f.) Schinz: 183 (1895).

Much-branched, erect, annual or perennial herbs. **Leaves** alternate or occasionally opposite, linear to oblong, sessile, entire. **Inflorescences** elongated, bracteate, spike-like thyrses; each bract with 1–more central bisexual flowers and 2–more lateral sterile modified flowers, each formed of an accrescent, finally spinous-margined process, fused with indurate base of partial inflorescence so that the whole falls as a unit (a burr) complete with bracteoles; bracts persistent on inflorescence axis. **Tepals** 5, narrow, 3-nerved, ± pilose or floccose, connate at base, acuminate or pungent. **Stamens** 5; filaments slender, connate below; pseudostaminodes 0; anthers narrow, 2-thecous, each theca with an awn-like tail at each end. **Ovary** ± compressed, villous or glabrous; ovule solitary, erect; style very short; stigma with a tuft of whitish penicillate hairs. **Capsule** scarcely compressed, with a firm apex, delicate below, thin-walled, indehiscent. **Seed** ± horseshoe-shaped, compressed, brown, smooth and shining; perisperm/endosperm copious.

Species 2, both in sthn Afr., widespread in warm arid regions, Namibia, Botswana, Northern Province, North-West, Free State and Northern Cape.

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Anacardiaceae

(Rosidae—Sapindales)

Compiled by R.H. Archer

Trees, shrubs or suffrutices; dioecious or monoecious, but with occasional bisexual flowers; often with resinous bark; sometimes with watery latex; crushed foliage often with turpentine-like odour. **Leaves** usually alternate, rarely opposite or subopposite (*Protorhus*), simple, 3-foliolate, or imparipinnate, entire to coarsely toothed; stipules 0. **Flowers** small, usually regular and male and female similar, mostly in terminal or axillary panicles. **Calyx** 4–7-fid or -partite, rarely spathaceous or irregularly ruptured. **Petals** 4–7, usually free, rarely connate and adnate to torus. **Disc** ± annular, rarely stalked or of separate glands. **Stamens** as many as or twice as many as petals, or many; filaments free; anthers 2-thecous,with longitudinal dehiscence. **Ovary** superior, (1–)3–5-carpous, 1(2–4)-locular; ovule solitary, adnate to ovary wall, or pendulous from a basal funicle; styles 1–5, free or connate, sometimes lateral; stigmas often capitate. **Fruit** usually drupaceous or dry with resinous or oleaginous mesocarp and coriaceous endocarp, sometimes winged. **Seeds** erect, horizontal or pendulous with membranous or coriaceous testa; endosperm 0 or rarely present.

Genera ± 60; species ± 600; chiefly tropical but also Mediterranean, E Asia and America; sthn Afr.: 13 genera (3 exotic), ± 110 species.

Sonder: 502 (1860) under Terebintaceae; Fernandes & Fernandes: 550 (1966); Merxmüller & Schreiber: 1 (1968); Kokwaro: 1 (1986).

Key to genera

1a Leaves compound, trifoliolate, or variably imparipinnate:
  2a Leaves variably imparipinnate:
    3a Ovary 2–4-locular; fruit large, fleshy, with prominent stone, brown.....**Sclerocarya**
    3b Ovary 1(2)-locular:

4a Fruit fleshy:
5a Stamens 8; leaflets straight, sessile or petiolulate ..... **Lannea**
5b Stamens 7–10; leaflets falcately narrowly ovate, subsessile ..... **Harpephyllum**
4b Fruit dry:
6a Fruit somewhat flattened, with parchment-like covering and surrounded by enlarged, coloured calyx; leaflets opposite; rachis winged ..... **Loxostylis**
6b Fruit small, dry, with reddish chartaceous exocarp ..... ***Schinus**
2b Leaves nearly always trifoliolate:
7a Fruit a small, fleshy or dryish drupe ..... **Rhus**
7b Fruit with membranous, winged pericarp ..... **Smodingium**
1b Leaves simple:
8a Leaves opposite or nearly so, margin entire; stamens 5, arising below disc; styles 3, connate at base ..... **Protorhus**
8b Leaves alternate:
9a Leaves with serrate margin; ovary 1-locular; style lateral with minutely 2-lobed stigma; fruit compressed, narrowly winged ..... **Laurophyllus**
9b Leaves with entire margin:
10a Style and stigma 1; male flowers with 1(2) fertile stamens:
11a Pedicel and receptacle swollen and fleshy in fruit, finally larger than compressed fruit; fruit not fleshy..... ***Anacardium**
11b Pedicel and receptacle not fleshy; drupe large, ovoid or subglobose, pulpy ..... ***Mangifera**
10b Styles and stigmas 3; male flowers with all stamens normal:
12a Ovary asymmetrical, narrowed into a neck below styles; styles united towards base ..... **Heeria**
12b Ovary symmetrical; styles free or nearly so, without columnar base ..... **Ozoroa**

*Anacardium L. 4546000

Linnaeus: 383 (1753); Fernandes & Fernandes: 551 (1966); Kokwaro: 2 (1986).

Trees or shrubs, polygamo-dioecious. **Leaves** alternate, simple, entire, coriaceous. **Flowers** in corymbose terminal panicles. **Sepals** 5, imbricate, slightly connate at base. **Petals** 5, imbricate, reflexed, caducous. **Stamens** 7–10, 1 or 2 fertile, rest sterile, unequal; filaments connate at base. **Disc** 0. **Ovary** 1-carpous, 1-locular; ovule single, ascendent; style 1 with capitate stigma. **Fruit** obliquely reniform on swollen pedicel. **Seeds** reniform with 2 large, white, thick cotyledons. x = 10, 12 or 6 (polyploidy).

Species 8 in tropical America; **Anacardium occidentale* L., Cashew Nut, a strong-growing, spreading tree, is becoming naturalised in parts of subtropical KwaZulu-Natal.

Harpephyllum Bernh. 4562000

Bernhardi: 349 (1844); Sonder: 525 (1860); Fernandes & Fernandes: 555 (1966).

Trees, dioecious, glabrous. **Leaves** alternate, imparipinnate; leaflets entire, falcately narrowly ovate. **Flowers** in axillary panicles. **Male flowers**: calyx 4- or 5-lobed; petals 4 or 5; stamens 7–10; ovary vestigeal. **Female flowers**: disc saucer-shaped, with somewhat crenate rim; staminodes conspicuous; ovary 1(2)-locular, 1 locule often reduced, ± ellipsoid, with thick walls, with a solitary, pendulous ovule; styles 4 or 5, separate, with truncate stigmas. **Fruit** a fleshy drupe with bony endocarp; stone 1(2)-locular with 1 operculum per locule, concealed by ridges. **Seeds** reniform, flattened.

Species 1: *Harpephyllum caffrum* Bernh., sthn Afr.: Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape; in riverine forests.

Heeria Meisn. 4589000

Meisner: 75 (1837); Fernandes & Fernandes: 150 (1965).

Rhus L.: 265 (1753) in part; Sonder: 504 (1860) in part; Phillips: 474 (1951) in part.

Shrubs or small trees, monoecious. **Leaves** alternate, simple, entire, petiolate, coriaceous, discolorous. **Flowers** in terminal panicles or racemes. **Male flowers**: calyx 5- or 6-segmented; petals 5 or 6, oblong, longer than stamens; disc lobed; stamens 5–10. **Female flowers**: calyx and corolla as in male; disc annular; staminodes 5–10; ovary 1(3)-locular with a single, basal ovule, asymmetrical, extending into a small column supporting styles; styles 3, united towards base, spreading above; stigmas somewhat capitate. **Fruit** a subfleshy, depressed, globose drupe, yellowish green, longitudinally rugose-striate.

Species 1, sthn Afr.: *Heeria argentea* (Thunb.) Meisn., common in Western Cape.

Lannea A.Rich. 4563000

Richard: 153, t. 42 (1831) name conserved; Fernandes & Fernandes: 557 (1966); Kokwaro & Gillett: 748 (1980).

Odina Roxb.: 293 (1832); Sonder: 503 (1860).

Trees or suffrutices. **Leaves** alternate, imparipinnate or trifoliolate with opposite, often discolorous leaflets; rachis sometimes shortly winged. **Flowers** bisexual or some unisexual, often arising before leaves, in panicled, terminal racemes and with peduncle sometimes stellately hairy. **Calyx** shortly 4-lobed, persistent. **Petals** 4(–6), spreading, imbricate. **Disc** annular, fleshy, entire or crenate. **Stamens** 8, arising on disc; filaments flattened; anthers ovate or sometimes sagittate. **Ovary** 1-locular with 1 pendulous ovule; in male flowers 4(–6)-partite; styles 4, short or sometimes longer than petals; stigmas simple or subcapitate. **Fruit** a fleshy drupe, with remains of styles. **Seeds** half-moon-shaped. x = 10 (7) (polyploidy).

Species ± 40, Africa to India; 6 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Laurophyllus Thunb. 4587000

Thunberg: 104 (1792).

Botryceras Willd.: 396 (1811); Sonder: 524 (1860).

Trees or shrubs, dioecious, resinous. **Leaves** alternate, simple, petiolate, elliptic, serrate. **Inflorescence** paniculate, often galled. **Male flowers**: in terminal panicles; calyx 4- or 5-cleft nearly to base, with imbricate lobes; petals 4 or 5, similar to sepals; disc fleshy, somewhat convex; stamens 4 or 5, slightly exserted, alternat-

ing with sepals; filaments ± as long as anthers; pistil 0. **Female flowers**: densely clustered; calyx similar to male; petals lanceolate, coloured; ovary 1-locular, subcompressed, suborbicular, with a single, pendulous ovule; style 1, lateral, with minutely 2-lobed stigma. **Fruit** a small achene, compressed, narrowly winged; pericarp with raised veins. **Seeds** with chartaceous testa.

Species 1: *Laurophyllus capensis* Thunb.; Swellendam in Western Cape to Uitenhage in Eastern Cape.

Loxostylis A.Spreng. ex Rchb. 4586000

Reichenbach: t. 205 (1830); Sonder: 524 (1860); Killick: t. 1536 (1968).

Trees, dioecious. **Leaves** alternate, imparipinnate, 2–6-jugate; leaflets opposite, lanceolate; rachis winged. **Flowers** in terminal panicles. **Male flowers**: calyx 5-lobed, with campanulate tube; petals 5, reflexed; disc of five 2-lobed scales; stamens 5, free, unequal, arising between disc scales; pistil 0. **Female flowers**: calyx 5-parted; segments narrowly ovate-linear, becoming enlarged and pinkish in fruit; petals similar to sepals; disc of 5 broad, 2-notched glands; stamens rudimentary; ovary 1-locular, obliquely obovoid, papillate, with a single, basal ovule; styles 1–4, unequal, arising laterally; stigmas capitate. **Fruit** a dry drupe, oblique, somewhat flattened, with persistent calyx and remains of styles, rugose. **Seeds** compressed.

Species 1: *Loxostylis alata* A.Spreng. ex Rchb., KwaZulu-Natal, Eastern Cape to Western Cape in the Humansdorp and Willowmore Districts.

*__Mangifera__ L. 4545000

Linnaeus: 200 (1753); Fernandes & Fernandes: 552 (1966); Kokwaro: 3 (1986).

Erect, evergreen trees, polygamous. **Leaves** alternate, simple, entire. **Flowers**: male and bisexual flowers in same terminal or subterminal panicles. **Sepals** (4)5(–7), free, imbricate. **Petals** (4)5(–7), imbricate, dark yellow nerves conspicuous. **Stamens** 5–10, 1(2–5) fertile, others sterile; filaments filiform. **Disc** 4- or 5-lobulate or vestigeal. **Ovary** subglobose, 1-locular with a single ovule; style 1. **Fruit** a fleshy drupe, subreniform or ovoid with fleshy mesocarp and fibrous woody endocarp. **Seeds** oblong-ovoid, compressed, with chartaceous testa; embryo with cotyledons plano-convex; radicle ascendent. $x = 10$ (polyploidy).

Species ± 62 in SE Asia; many cultivars of **Mangifera indica* L. (Mango) in sthn Afr., widely cultivated and sometimes escapes in subtropical forests in KwaZulu-Natal.

Ozoroa Delile 4589010

Delile: 91, t. 1, fig. 3 (1843); Fernandes & Fernandes: 150 (1965); Fernandes: 19 (1966); Fernandes & Fernandes: 574 (1966); Kokwaro: 4 (1986); Von Teichman & Van Wyk: 175 (1994).

Rhus L.: 265 (1753) in part; Sonder: 504 (1860) in part. *Heeria* of authors, in part, not of Meisn. 1837; Phillips: 474 (1951) in part.

Shrubs or small trees, dioecious. **Leaves** alternate, simple, entire to undulate, petiolate or subsessile, usually discolorous, hairy. **Flowers** in axillary or terminal panicles. **Male flowers**: calyx 5-segmented; petals 5, elliptic; disc lobed; stamens 5. **Female flowers**: calyx and corolla as in male; disc annular; staminodes 5, rudimentary; ovary 1-locular, symmetrical, with a single basal ovule; styles 3, free or nearly so; stigmas somewhat capitate. **Fruit** a dry or subfleshy, reniform or subglobose drupe, often black, irregularly rugulose. **Seeds** pendulous from basal funicle.

Species ± 40, Africa and Arabian Peninsula, possibly Madagascar; ± 20 in sthn Afr.; widespread.

Protorhus Engl. 4576000

Engler: 377, 420 (1881); Fernandes: 37 (1966); Von Teichman & Van Wyk: 175 (1994).

Trees, dioecious, sometimes with bisexual flowers. **Leaves** opposite or subopposite, simple, entire to undulate. **Flowers** in small, axillary or large, terminal panicles. **Calyx** 1-partite. **Petals** 5, imbricate. **Disc** urceolate in male, and saucer-shaped in female flowers. **Stamens** 5, arising below rim of disc. **Ovary** 1-locular, ovoid or subglobose, with a solitary, pendulous ovule; funicle attached laterally to wall which has oil ducts; styles 3, connate at base; stigmas capitate. **Fruit** a black, 1-seeded drupe. **Seeds** oblong, with membranous testa.

Species ± 20, Madagascar; 1 in sthn Afr.: *Protorhus longifolia* (Bernh.) Engl., Namibia, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Northern and Eastern Cape.

Rhus L. 4594000

Linnaeus: 265 (1753); Sonder: 504 (1860) in part; Schonland: 3 (1930); Fernandes & Fernandes: 590 (1966); Fernandes:123 (1967); Moffett: 1 (1993).

Searsia Barkley: 472 (1942).

Shrubs or trees, usually dioecious, rarely with bisexual flowers; sometimes armed; prominently lenticellate. **Leaves** alternate, usually 3-foliolate, entire, crenate to coarsely dentate, usually petiolate, with petiole sometimes winged. **Flowers** unisexual, very rarely bisexual, in axillary or terminal panicles, bracteate. **Calyx** (4)5(6)-partite, sometimes with segments unequal. **Petals** (4)5(6), usually inconspicuous. **Disc** usually 5(–10)-crenate. **Male flowers**: stamens 5; pistil rudimentary. **Female flowers**: staminodes usually 5; ovary 3-carpous, 1(2, 3)-locular with 1(2, 3) ovules, subglobose or compressed; styles 3, free; stigmas usually ± capitate. **Fruit** a small globoid or compressed drupe. **Seeds** reniform, exalbuminous. $x = 15$ (aneuploids, polyploidy, B-chromosomes).

Species ± 200, mostly tropical and subtropical countries; ± 75 in sthn Afr., widespread in forest and scrub.

*__Schinus__ L. 4582000

Linnaeus: 388 (1753); Barkley: 160 (1944).

Trees to shrubs. **Leaves** imparipinnate; leaflets subsessile, entire or dentate. **Flowers** in axillary panicles. **Sepals** 4 or 5, deltoid, ovoid or rotund, glabrous to densely pilose. **Petals** 4 or 5, ovate, truncate, usually glabrous. **Stamens** 8–10, unequal, stamens in pistillate flowers smaller. **Disc** thick, lobed. **Ovary** 1-locular with a single suspended ovule; style 1. **Fruit** a small, slightly fleshy to dry drupe with thin, chartaceous, shining red exocarp. **Seeds** 1. $x = 7, 15$ (polyploidy).

Species ± 25, South and Central America; 2 introduced in sthn Afr.: **Schinus molle* L., Pepper Tree, widely cultivated because of its hardy nature, sometimes found as an escape, **S. terebinthifolius* Raddi, has similar fruit, but broader leaflets, less frequently found as an escape.

Sclerocarya Hochst. 4558000

Hochstetter: 1 (1844); Sonder: 524 (1860); Fernandes & Fernandes: 552 (1966); Kokwaro & Gillett: 756 (1980); Kokwaro: 42 (1986).

Trees or shrubs, usually dioecious. **Leaves** crowded at tips of branches, alternate, imparipinnate; leaflets petiolate, entire, usually acuminate. **Flowers** sometimes bisexual, mostly unisexual, in spikes in male and solitary in female plants. **Sepals** 4 or 5, oblong or orbicular, imbricate. **Petals** 4 or 5, oblong or obovate, imbricate. **Disc** depressed, entire, or somewhat raised in male flowers. **Stamens** 10–16(–26), fewer in female flowers and apparently sterile. **Ovary** 2- or 3(4)-locular, with a solitary,

pendulous ovule in each locule; styles 2–4, distant, short, with peltate stigma. **Fruit** a fleshy, pale green to yellow drupe; endocarp bony, with 1–4 ovate opercules at apex. **Seeds** 2 or 3, obclavate with thin brown testa. $x = 13$ (1 report).

Species 2, Africa and Madagascar, 1 in sthn Afr.: *Sclerocarya birrea* (A.Rich.) Hochst. subsp. *caffra* (Sond.) Kokwaro, Namibia, Botswana, Northern Province, North-Wcst, Gauteng, Mpumalanga, Swaziland and KwaZulu-Natal. Fruit favourcd by man and animals; seeds tasty and highly nutritious.

Smodingium E.Mey. ex Sond. 4588000

Sonder: 523 (1860); Ellis: 259 (1974).

Shrubs, dioecious, glabrous. **Leaves** alternate, digitately 3-foliolate, petiolate; leaflets lanceolate, coarsely toothed. **Flowers** small, in dense, terminal clusters. **Male flowers**: calyx 5-cleft, persistent; petals 5, reflexed; disc with subcrenate margin; stamens 5, opposite sepals. **Female flowers**: calyx and corollas as in male; disc annular; staminodes 5, rudimentary; ovary 1-locular, suborbicular, somewhat flattened, with a solitary, pendulous ovule; styles 3, free, lateral, persistent; stigmas capitate. **Fruit** an achene, with a membranous, winged pericarp, containing black, resinous ducts. **Seeds** kidney-shaped, with chartaceous testa.

Species 1: *Smodingium argutum* E.Mey. ex Sond., Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Lesotho and Eastern Cape; may cause severe dermatitis.

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Annonaceae

(Magnoliidae—Magnoliales)

Compiled by M. Jordaan

Trees, shrubs, rarely subshrubs, or climbers, often aromatic; stems with resin canals and septate pith. **Leaves** alternate, distichous, simple, entire, penninerved; stipules 0. **Inflorescences** terminal, leaf-opposed, axillary or supra-axillary, or cauliflorous, solitary, paired or in few- to many-flowered fascicles, or occasionally cymosely racemose. **Flowers** usually bisexual, occasionally unisexual, regular, very often fleshy or brittle, often drooping, fragrant; bracts often present. **Sepals** (2)3(4), valvate or imbricate in bud, free or connate, at least at base, persistent or deciduous. **Petals** hypogynous, 3–6(–12), usually 6, free, in two whorls of 3, imbricate or valvate in each whorl. **Stamens** many, rarely few, hypogynous; filaments short, thick and free or rarely longer and united into a tube; anthers linear, opening by longitudinal slits, with extrorse or lateral, rarely introrse, dehiscence; connective often produced into an appendage. **Gynoecium** consisting of many or few carpels, rarely 1, free or rarely united into a 1-locular ovary with parietal placentas; ovules 1 or 2, inserted at base of carpel or 1–several on ventral suture in 1 or 2 whorls, anatropous; styles free or connate, mostly shortly terete, thick; stigma capitate or oblong, sometimes sulcate or bilobed. **Fruit** either consisting of 1 to several fleshy or ± woody indehiscent or rarely dehiscent, sessile or stipitate monocarps, or syncarpous with numerous 1-seeded fruiting carpels, or 1-locular and many-seeded, cylindrical and often moniliform, rounded or irregular. **Seeds** rather large, sometimes arillate with a groove encircling seed; endosperm abundant, ruminate, hard, oily; embryo straight, minute.

Genera ± 130; species ± 2 300, pantropical; particularly in lowland evergreen forest; sthn Afr.: genera 8, species 14.

Jussieu: 283 (1789), as Anoneae; Dunal: 1 (1817); Candolle: 177 (1832); Endlicher: 830 (1839); Sonder: 7 (1860) as Anonaceae; Bentham: 20 (1862a); Prantl: 23 (1891); Fries: 1 (1959); Robson: 104 (1960); Van Setten & Maas: 675 (1990); Kessler: 93 (1993).

Key to genera

1a Carpels united in fruit, forming a fleshy or hard-shelled syncarp:

2a Fruits fleshy, orange when mature; petals in 2 equal whorls; hairs, if present, stellate and simple ..... **Annona**

2b Fruits dry and hard-shelled, blackish when mature; petals very unequal, united in lower parts; hairs absent or simple.... ..... **Monodora**

1b Carpels free or solitary in fruit, if more than 1 then forming a cluster of apparently separate fruits:
3a Hairs stellate and simple ..... **Uvaria**
3b Hairs simple or absent:
4a Climbers, rarely small trees, with leaf-opposed, laterally compressed hooks ..... **Artabotrys**
4b Habit various but leaf-opposed hooks absent:
5a Climbing or scrambling plants:
6a Branches with prominent lenticels, red or blackish; bracteoles small, ovate-oblong ..... **Monanthotaxis**
6b Branches without lenticels; bracteoles large, foliaceous and orbicular to broadly ovate with amplexicaul base.... ..... **Friesodielsia**
5b Erect trees or shrubs:
7a Fruits splitting open when ripe, stipitate; flowers greenish; flower bud extended into a straight or curved beak; petals long-acuminate from an ovate base ..... **Xylopia**
7b Fruits never splitting open, sessile; flowers cream, white or yellow; flower bud obtuse to subacute; petals transversely folded in bud... ..... **Hexalobus**

Annona L. 2729000

Linnaeus: 536 (1753); Linnaeus: 241 (1754); Endlicher: 834 (1839); Harvey: 583 (1862); Bentham: 476 (1862b); Oliver: 14 (1868); Prantl: 37 (1891); Engler & Diels: 76 (1901); Fries: 129 (1931); Fries: 1 (1959), accepted 17 sections; Robson: 141 (1960); Paiva: 107 (1966); Roessler & Schreiber: 1 (1968); Verdcourt: 112 (1971a); Van Setten & Maas: 678 (1990); Kessler: 126 (1993).

Trees, shrubs or shrublets, with simple or stellate hairs or glabrous. **Leaves** usually large, petiolate, often ± elliptic. **Inflorescences** fascicled, or occasionally cymosely racemose, terminal, leaf-opposed, supra-axillary or cauliflorous, or flowers solitary. **Flowers** usually bisexual, pedicellate, bracteolate; bracteoles 0–2, persistent. **Sepals** 3, valvate, free, much shorter than petals. **Petals** 6, valvate, or imbricate, in 1 or 2 whorls, subequal or inner whorl rudimentary or absent, free or connate at base. **Stamens** many; filaments linear or linear-valvate; anther thecae extrorse and often unequal at base; connective usually terminating in a swollen head or hood-like process above anther thecae. **Carpels** many, free at first or united from beginning, ± cylindrical, often hairy; ovule solitary, basal, erect; style clavate; stigma muricate. **Fruit** syncarpous, formed by united monocarps, indehiscent, fleshy, usually ovoid, spherical or cordiform, many-seeded. **Seeds** irregularly arranged in syncarp; with endosperm of firm, waxy plates, interspersed with membranous outgrowths from endocarp; aril carunculoid. $x = 7$ (aneuploids, polyploidy).

Species ± 110, mostly in tropical America, 4 in tropical Africa; 2 in sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal. Few species cultivated as fruit trees throughout the tropics.

Artabotrys R.Br. 2724000

Brown: t. 423 (1820); Endlicher: 833 (1839); Bentham: 466 (1862b); Oliver: 27 (1868); Hooker & Thomson: 53 (1872); Prantl: 36 (1891); Engler & Diels: 70 (1901); Robson: 129 (1960); Paiva: 88 (1966); Le Thomas: 128 (1969); Verdcourt: 56 (1971a); Van Setten & Maas: 678 (1990); Kessler: 117 (1993).

Shrubs or rarely small trees, usually climbing or scrambling, with simple hairs. **Leaves** petiolate, often ± elliptic, coriaceous. **Inflorescences** condensed cymes or flowers solitary, supra-axillary. **Flowers** bisexual, pedicellate, on flattened, hooked peduncles by which plants are supported; bracts and bracteoles small, often caducous. **Sepals** 3, valvate, equal to petals or shorter, free or ± connate at base, tomentose. **Petals** 6, free, valvate, in 2 whorls, subequal, spoon-shaped, concave and connivent at base. **Stamens** many; filaments oblong or cuneate, with or without appendages; connective with a truncate dilated apex; anther thecae dorsal or lateral. **Carpels** few or many, free, ovoid or ellipsoid; ovules 2, basal; style oblong or columnar; stigma fleshy. **Monocarps** indehiscent, succulent, cylindrical or ellipsoid, sessile, sometimes large and pear-shaped, 1- or 2-seeded. **Seeds** vertical, collateral; aril 0. $x = 8$ (aneuploids).

Species ± 100, tropics and subtropics of Old World; 2 in sthn Afr., Botswana, Northern Province and KwaZulu-Natal.

Friesodielsia Steenis 2691010

Van Steenis: 458 (1948); Van Steenis: 357 (1964); Verdcourt: 17 (1971b); Verdcourt: 86 (1971a); Van Setten & Maas: 681 (1990); Kessler: 120 (1993); Van Wyk: 42 (1994).

Polyalthia sect. *Oxymitra* Blume: 71, t. 35–37 (1830). *Oxymitra* (Blume) Hook.f. & Thomson: 145 (1855). *Guatteria* Blume: 60, t. 29, 31C (1830). *Unona* Hook.f. & Thomson in part Benth.: 469 (1862b); Oliver: 35 (1868). *Popowia* Engl. & Diels: 44, t. 17B (1901); Baker: 18 (1911); Robson: 123, t. 12A (1960); Paiva: 34 (1966); Roessler & Schreiber: 3 (1968).

Evergreen shrubs or rarely small trees, often multistemmed and scrambling or subscandent, with simple hairs. **Leaves** petiolate. **Flowers** bisexual, solitary, leaf-opposed or supra-axillary. **Sepals** 3, free, valvate, ± connate at base. **Petals** 6, valvate, in 2 whorls, inner much shorter than outer, cohering towards base. **Stamens** numerous, connective with a truncate dilated apex. **Carpels** numerous, ± cylindrical; ovules 1–5, lateral. **Monocarps** pendulous, moniliform with 1–many seed-containing segments, stipitate. **Seeds** ellipsoid; seed coat with numerous thin lamellae penetrating endosperm. $x = 8$ (1 report).

Species ± 50–60; tropical Asia and Africa; 1 in sthn Afr.: *Friesodielsia obovata* (Benth.) Verdc., Namibia and Botswana.

Hexalobus A.DC. 2716000

Candolle: 212 (1832); Oliver: 26 (1868); Prantl: 36 (1891); Engler & Diels: 55 (1901); Robson: 1 (1960); Paiva: 61 (1966); Roessler & Schreiber: 2 (1968); Le Thomas: 81 (1969); Van Setten & Maas: 682 (1990); Kessler: 113 (1993).

Trees or shrubs, with simple hairs. **Leaves** petiolate, often ± elliptic-oblong. **Inflorescences** 2- or 3-flowered fascicles, axillary or supra-axillary or flowers solitary. **Flowers** bisexual, sessile or shortly pedicellate, bracteolate; bracteoles 2–several, biseriate, caducous. **Sepals** 3, free, coriaceous, ovate, valvate, enclosing petals in bud, with margins not or scarcely bent outwards, densely brown- or fawn-pubescent. **Petals** 6, slightly imbricate, in 2 whorls, equal or subequal, connate at base into a small tube, valvate, transversely folded in bud, expanding and spreading at anthesis. **Stamens** many; anthers linear or linear-cuneate; connective thickened and truncate above thecae. **Carpels** 2 or 3, villous; ovules many, in 1 row; style very short; stigma 2-lobed, with lobes oblong or dilated. **Monocarps** indehiscent, succulent, cylindrical or ellipsoid, usually not or scarcely constricted, subsessile. **Seeds** horizontal; aril absent.

Species 5, tropical Africa from Senegal to Sudan and southwards to sthn Afr., 1 dubiously placed species (climber) recorded from Madagascar; 1 in sthn Afr.: *Hexalobus monopetalus* (A.Rich.) Engl. & Diels, Namibia, Botswana and Northern Province.

Monanthotaxis Baill. 2696000

Baillon: 878 (1890), in broad sense; Verdcourt: 20 (1971b); Verdcourt: 88 (1971a); Van Setten & Maas: 683 (1990); Kessler: 123 (1993).

Popowia in sense of various authors, all Afr. species, not of Endl.: 831 (1839); Engler & Diels: 53 (1901); Robson: 122 (1960); Paiva: 34 (1966); Le Thomas: 255 (1969). *Unona* Benth: 469 (1862); Oliver: 35 (1868).

Small trees, shrubs or woody climbers with simple hairs. **Inflorescences** few-flowered fascicles, or flowers solitary, supra-axillary, rarely axillary. **Flowers** bisexual or unisexual, small, mostly pedicellate, bracteolate; bracteoles often persistent, quite conspicuously leafy and usually situated on lower half of pedicel, frequently minute. **Sepals** (2)3, valvate, free or ± connate at base, much shorter than petals. **Petals** (4–)6, valvate, in 1 or 2 whorls, free or slightly connate at base, inner shorter than outer, ± clawed. **Stamens** 6–many, in 1 to several whorls, or rarely 6 alternating with 6 staminodes; connective without a prolonged apex, sometimes with lateral appendages. **Carpels** few to many, free, cylindrical, ellipsoid or obconic; ovules 1–8, lateral, in 1 whorl; style as long as or shorter than ovary; stigma bifurcate or grooved. **Monocarps** indehiscent, ± cylindrical, mostly stipitate, 1–8-seeded, often fleshy, mostly constricted between seeds, articles easily breaking off. **Seeds** oblong-ellipsoid, ovoid or subglobose, vertical; testa intrusions into endosperm lamelliform.

Species ± 60; tropical Africa and Madagascar; 1 in sthn Afr.: *Monanthotaxis caffra* (Sond.) Verdc., Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Monodora Dunal 2733000

Dunal: 34, 79 (1817); Endlicher: 834 (1839); Bentham: 473 (1862); Oliver: 37 (1868); Prantl: 38 (1891); Engler & Diels: 84 (1901); Robson: 145 (1960); Le Thomas: 338 (1969); Verdcourt: 124 (1971a); Codd: t. 1870 (1982); Van Setten & Maas: 683 (1990); Kessler: 128 (1993); Thulin: 19 (1993).

Trees or shrubs, sometimes climbing or scrambling, with simple hairs or glabrous; young shoots frequently blackening and becoming brittle on drying. **Leaves** petiolate, often ± elliptic, thin. **Inflorescences** paired or few-flowered cymes, terminal or extra-axillary or in axils of fallen leaves, or flowers solitary. **Flowers** bisexual, pedicellate, bracteolate; bracteole single, often large and leafy, usually amplexicaul, persistent. **Sepals** 3, valvate, free, much shorter than petals. **Petals** 6, valvate, in 2 whorls, all connate at base, inner smaller than outer, clawed, usually with crisped or undulate margins, connivent at apex until anthesis. **Stamens** many, without filaments; anthers oblong or cuneiform to orbicular, with extrorse dehiscence; connective prolongation thickened. **Carpels** several, united, 1-locular, globose or conical, with parietal placentation; ovules numerous; stigmas sessile, radiating. **Fruit** syncarpous, a coriaceous or ligneous berry, globose to ellipsoid or obovoid, stipitate, many-seeded; pericarp leathery or woody. **Seeds** irregularly arranged, shining; aril 0. $x = 8$.

Species ± 15, confined to tropical Africa; 1 in sthn Afr.: *Monodora junodii* Engl. & Diels, Northern Province and KwaZulu-Natal.

Uvaria L. 2673000

Linnaeus: 536 (1753); Linnaeus: 240 (1754); Endlicher: 832 (1839); Sonder: 8 (1860); Bentham: 464 (1862b); Oliver: 19 (1868); Hooker & Thomson: 47 (1872); Prantl: 30 (1891); Engler & Diels: 7 (1901); Robson: 106 (1960); Le Thomas: 37 (1969); Verdcourt: 2 (1971b); Verdcourt: 10 (1971a); Van Setten & Maas: 687 (1990); Kessler: 111 (1993).

Climbing, straggling or erect shrubs or small trees, usually with stellate and sometimes also simple hairs. **Leaves** ± leathery, mostly elliptic-oblong. **Inflorescences** short terminal cymes, opposite leaves, only rarely axillary or flowers solitary. **Flowers** usually bisexual, dull to yellowish green. **Sepals** 3, valvate, often connate at base, or calyx cupular in bud and later splitting into often irregular lobes. **Petals** 6, imbricate, in 2 whorls, subequal, sometimes connate at base; inner somewhat smaller than outer and without glands at base. **Stamens** many, inserted on torus surrounding carpels; filaments very short or absent, outer sometimes sterile and leaf-like; anther thecae lateral or extrorse; connective expanded into a truncate appendage. **Carpels** many, free, linear-oblong in outline, sometimes angular and furrowed; ovules few–many in 1 or 2 rows; style absent or short and thick; stigma 5, horseshoe-shaped or funnel-shaped with a slit down inner side, with involute margins. **Monocarps** indehiscent, ± oblique, oblong to ovoid to subglobose, stipitate or subsessile, 1–many-seeded, dry or sometimes fleshy when ripe. **Seeds** horizontal or oblique, ovate, brown and shiny; aril small or 0. $x = 8$ (aneuploids).

Species ± 110, mostly tropical Asia, Australia and Africa; 3 in sthn Afr., Northern Province, Swaziland, KwaZulu-Natal and Eastern Cape.

Xylopia L. 2717000

Linnaeus: 1250 (1759) name conserved; Endlicher: 832 (1839); Bentham: 478 (1862b); Oliver: 29 (1868); Prantl: 36 (1891); Engler & Diels: 57 (1901); Fries: 86 (1930); Robson: 133 (1960); Paiva: 66 (1966); Roessler & Schreiber: 3 (1968); Verdcourt: 72 (1971a); Kessler: 117 (1993).

Trees, shrubs or shrublets, not climbing, with simple hairs. **Leaves** often ± elliptic, usually membranous or coriaceous. **Inflorescences** axillary cymes or fascicles or flowers solitary. **Flowers** bisexual, pedicellate or sessile, often fragrant, bracteolate; bracteoles (1)2–5, caducous or persistent. **Sepals** 3, ± connate, valvate, much shorter than petals. **Petals** 6, free, valvate, in 2 whorls, subequal or outer larger than inner, spoon-shaped, erect or spreading. **Stamens** many, linear, outer and inner often flattened and staminodal; filaments articulated, sometimes connate at base, enclosing gynoecium; anther thecae extrorse, transversely septate; connective prolongation capitate. **Carpels** many to few, free, rarely solitary, ovoid-cylindrical or ± flattened; ovules many; styles cylindrical or narrowly clavate, aggregated. **Monocarps** obovoid to cylindrical, mostly stipitate, dehiscent or indehiscent, ± fleshy, 1–8-seeded. **Seeds** vertical to horizontal, collateral or biseriate; aril sometimes small. $x = 8$.

Species ± 100–160, pantropical, Africa, Madagascar, Asia, Malaya and America; 3 in sthn Afr., Namibia and Northern Province.

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Apiaceae (Umbelliferae)

(Asteridae—Asterales)

Compiled by B-E. van Wyk

Herbs, annual or perennial, often with a tuberous rootstock, occasionally shrubs or trees, often aromatic. **Leaves** usually alternate, rarely opposite, often radical, usually with a sheathing petiole, variously divided or sometimes simple; stipules 0. **Flowers** usually small, regular and bisexual, rarely unisexual, in simple or compound umbels, rarely heads subtended by involucres, rarely without. **Calyx** with tube adnate to ovary, with (usually 5) or without lobes. **Petals** 5, free, inserted on margin of disc, usually with inflexed apices and keeled on inner face, soon falling. **Disc** expanded, depressed or conical, with entire or crenate margin. **Stamens** 5, alternating with petals; filaments inflexed in bud; anthers 2-thecous, opening laterally. **Ovary** inferior, (1)2(3)-locular, with a single, pendulous ovule in each locule; styles 2, short or long, free, sometimes with a thickened base (stylopodium). **Fruit** a dry schizocarp, usually crowned with calyx, disc and styles; fruit splitting down a septum (commissure) into 2 single-seeded, indehiscent mericarps, at first joined by their (commissural, inner) faces, and mostly suspended from a common, slender, divided or unbranched stalk (carpophore) derived from main vascular strand of fruit; mericarps typically with 5 primary ribs: 1 dorsal, 2 lateral, 2 commissural, and between them 4 secondary ridges, all running longitudinally from base to stylar end of fruit; mericarps either similar (homomorphic) or different (heteromorphic) in shape, sometimes winged, glabrous, villous, or spiny, usually with intervallecular vittae (oil ducts in furrows between ribs), or vittae sometimes intrajugal (within ribs). **Seeds** various.

Genera ± 453; species over 3750, cosmopolitan, mainly in temperate regions; sthn Afr.: genera 36 (8 naturalised), species 152 (15 naturalised). The following genera and species are encountered as rare escapes and are not included in the key and descriptions: **Cancalis* L. (5950000) – the only species: **C. platycarpos* L., is a cosmopolitan weed of Europe; **Pastinaca* L. (6120000) – a genus of 14 species from Europe and Asia; 1 species: **P. sativa* L., the cultivated Parsnip, occurs as an occasional escape in moist situations; **Petroselinum* Hill (6006000) – **P. crispum* (Mill.) A.W. Hill, the cultivated herb Parsley, is an occasional escape.

Sonder: 524 (1862); Drude: 63 (1898); Schreiber: 1 (1967); Cannon: 555 (1978); Burtt: 133 (1991); Pimenov & Leonov: 1 (1993); Plunkett, Soltis & Soltis: 565 (1997).

Drude's (1898) classification system is likely to be modified as a result of evidence from DNA sequence data, e.g. Plunkett, Soltis & Soltis (1997). Some genera of the Hydrocotyloideae (*Centella*, *Hydrocotyle*) for example, have already been transferred to the Araliaceae but a formal new classification system for the two families (Apiaceae and Araliaceae) has not yet been published. Drude's system is not followed here, but the three subfamilies represented in sthn Afr. are as follows:

I. Subfamily HYDROCOTYLOIDEAE: *Hermas*

II. Subfamily SANICULOIDEAE: *Alepidea*, *Arctopus*, *Sanicula*

III. Subfamily APIOIDEAE: all remaining genera

The following key is that of Burtt (1991), with slight modifications to accommodate recent taxonomic changes.

Key to genera

1a Leaves simple or palmately lobed or palmately compound:
  2a Plants woody, not dying down to ground level after flowering:
    3a Fruit hairy ..... **Deverra**
    3b Fruit glabrous:
      4a Mericarps heteromorphic, winged:
        5a Margins of leaflets toothed; seed loose within endocarp ..... **Polemanniopsis**
        5b Margins of leaf or leaflets entire; seed adherent to endocarp ..... **Heteromorpha**

4b Mericarps homomorphic, not winged:
6a Leaves flat, palmately lobed, with distinct intramarginal nerve ..... **Polemannia**
6b Leaves ± terete ..... **Anginon**
2b Plants herbaceous (i.e. stems dying down to ground level after flowering, occasionally radical leaves persistent, or stems creeping and only the inflorescences dying):
7a Leaves palmately compound:
8a Fruit dorsally flattened ..... **Peucedanum**
8b Fruit not flattened ..... **Pimpinella**
7b Leaves simple or palmately lobed to partite (*Sanicula*):
9a Leaf blade many times longer than broad:
10a Umbels (heads) simple with conspicuous involucre of bracts united at base, pale green, greenish yellow or silvery white, sometimes becoming pinkish inside ..... **Alepidea**
10b Umbels compound; involucral bracts free:
11a Leaves grass-like, tapered to an acute tip; flowers yellow ..... **Bupleurum**
11b Leaves linear or spathulate, blunt; flowers white ..... **Itasina**
9b Leaf blade not more than 3 times as long as broad:
12a Plants acaulescent; leaves prickly, in dense rosette; flowers unisexual; fruit 1-seeded ..... **Arctopus**
12b Plants caulescent; leaves not prickly (at most with strong marginal cilia); flowers bisexual or andromonoecious; fruit 2-seeded:
13a Umbels simple, or seemingly so by forming compact heads:
14a Leaves palmately lobed or divided:
15a Involucral bracts united; fruit glabrous except for some blunt scales at the top ..... **Alepidea**
15b Involucral bracts free; fruit with hooked bristles ..... **Sanicula**
14b Leaves entire or toothed:
16a Leaves tomentose below; involucral bracts free ..... **Hermas**
16b Leaves never tomentose below; involucral bracts united ..... **Alepidea**
13b Umbels manifestly compound, umbellules with conspicuous peduncles:
17a Leaves palmately lobed, cordate or peltate; fruit with vittae in the furrows ..... **Dracosciadium**
17b Leaves palmately trifid; fruit with vittae below veins in the ribs ..... **Lichtensteinia**
1b Leaves pinnate, pinnately lobed or decompound, or basal leaves simple and cauline leaves pinnately dissected:
18a Plants woody, not dying to ground level after fruiting:
19a Fruit (and ovaries) hairy or bristly:
20a Leaves thick, fleshy ..... **Marlothiella**
20b Leaves not fleshy:
21a Plant leafless at flowering; leaves, if present, with linear segments ..... **Deverra**
21b Plant with well developed leaves at flowering; leaf segments broadly elliptic ..... **Diplolophium**
19b Fruit (and ovaries) glabrous:
22a Mericarps unequal, ribs winged ..... **Heteromorpha**
22b Mericarps equal, ribs not winged or with wing-like ridges only:
23a Fruit not flattened, or slightly compressed laterally:
24a Fruit ribs without wing-like extensions; surface between the ribs tuberculate or wrinkled ..... **Anginon**
24b Fruit ribs without wing-like extensions; surface smooth between the ribs:
25a Lower leaves with broad segments, upper ones with linear segments; sparsely hairy at least along lower midrib; stem not conspicuously ribbed ..... **Glia**
25b Lower and upper leaf segments linear to subterete segments; glabrous; stems ribbed ..... **Stenosemis**
23b Fruit strongly flattened dorsoventrally:
26a Shrub or small tree; leaves deciduous, simply pinnate with fine-tipped teeth; vittae inconspicuous or absent in ripe fruit ..... **Steganotaenia**
26b Subshrub; leaves evergreen, pinnatisect; vittae conspicous, one in each furrow between the ribs and 2 on the commissure ..... **Peucedanum**
18b Plants herbaceous, either dying down to ground level after fruiting or low creeping herbs:
27a Foliage leaves all radical, those on the stem reduced to a sheath with or without a vestigial lamina:
28a Fruit with vittae below the veins in the ribs ..... **Lichtensteinia**
28b Fruit with vittae in the furrows between ribs:
29a Fruit strongly dorsoventrally flattened; basal leaves sometimes present at flowering ..... **Peucedanum**
29b Fruit not flattened; leaves usually withered or not yet produced at flowering:
30a Mericarps heteromorphic ..... **Annesorhiza**
30b Mericarps homomorphic:
31a Fruit oblong with strong, yellow, almost contiguous ridges, 5 mm or longer ..... **Annesorhiza**
31b Fruit ovoid or flask-shaped with ribs well spaced, shorter than 4 mm ..... **Chamarea**
27b Foliage leaves both radical and cauline:
32a Fruit hairy or bristly:
33a Perennials or biennials:
34a Involucre absent ..... **Pimpinella**
34b Involucre present:

35a Involucral bracts pinnatisect ..... *Daucus
35b Involucral bracts entire:
36a Low spreading herb; umbels simple or apparently so because of very short rays ..... Agrocharis
36b Erect herbs; umbels obviously compound:
37a Leaves pinnate with broad leaflets ..... Diplolophium
37b Leaves usually absent at flowering, if present segments linear ..... Deverra
33b Annuals or biennials:
38a Fruit processes large, multicellular, cells multiseriate, sometimes flattened at the base and usually with recurved barbs (glochids) at the apex:
39a Processes arranged on ribs (especially the secondary ribs) of the fruit, the larger much flattened at base; involucral bracts pinnate ..... Daucus
39b Processes spread over surface of fruit, scarcely flattened at base; involucral bracts entire ..... Torilis
38b Fruit processes unicellular, or at least of uniseriate cells, neither flattened nor barbed:
40a Fruit oblong ..... Ezosciadium
40b Fruit ± as broad as long:
41a Fruit much flattened, discoid, margins thickened, mericarps not separating ..... Choritaenia
41b Fruit not flattened, mericarps separating when ripe:
42a Erect; basal leaves usually cordate, upper dissected; involucre absent ..... Pimpinella
42b Dwarf, branched from base; all leaves dissected; involucre present:
43a Fruit ovoid; lateral ribs marginal ..... Sonderina
43b Fruit distinctly didymous; lateral ribs not marginal ..... Stoibrax
32b Fruit glabrous:
44a Perennials or biennials:
45a Fruit dorsoventrally flattened ..... Peucedanum
45b Fruit ± round in cross section:
46a Fruit at least twice as long as broad:
47a Leaf segments filiform; plant strongly aromatic; flowers yellow ..... *Foeniculum
47b Leaf segments flat; plant weakly aromatic; flowers white ..... *Anthriscus
46b Fruit distinctly less than twice as long as broad:
48a Involucre absent:
49a At least some of the umbels shortly pedunculate, apparently leaf-opposed ..... Apium
49b All umbels on well developed peduncles ..... Pimpinella
48b Involucre present:
50a Leaves once-pinnate:
51a Teeth on leaflet margin spreading ..... Berula
51b Teeth on leaflet margin incurved and often slightly overlapping ..... Sium
50b Leaves decompound:
52a Low growing, somewhat fleshy maritime herb; fruit with rather thick but narrow wings; vittae persistent; endosperm not sulcate ..... Dasispermum
52b Erect biennial, 0.5–3.0 m high; leaves not fleshy; fruit only ridged; vittae not usually visible in mature fruit; endosperm sulcate ..... Conium
44b Annuals or biennials:
53a Involucral bracts pinnatisect ..... *Ammi
53b Involucral bracts undivided or absent:
54a Fruit strongly flattened dorsoventrally ..... Capnophyllum
54b Fruit not strongly flattened dorsoventrally, sometimes laterally compressed:
55a Involucre absent:
56a Outer flowers with outer petals enlarged ..... *Coriandrum
56b Outer flowers with all petals equal:
57a Calyx teeth obsolete:
58a Biennial; umbels strongly pedunculate ..... Conium
58b Annual; umbels sessile or subsessile ..... *Cyclospermum
57b Calyx teeth distinct:
59a Vallecular vittae 2 or more; stem erect, not branched in lower part; basal leaves often simply cordate ..... Pimpinella
59b Vallecular vittae solitary; stem branched in lower part; basal leaves pinnatisect ..... Sonderina
55b Involucre present:
60a Surface of fruit covered with close-set clavate vesicles ..... Phlyctidocarpa
60b Surface of fruit without vesicles:
61a Endosperm sulcate on commissural face; erect biennial branched only in upper part; radical leaves usually ± 300 mm long ..... Conium
61b Endosperm not sulcate; low-growing plants, radical leaves usually only 150 mm long:
62a Leaves fleshy; fruit with narrow but thickish wings ..... Dasispermum
62b Leaves not fleshy; fruit with slender ribs ..... Sonderina

Agrocharis Hochst. 5950010

(Apioideae)

Hochstetter: 19 (1844); Heywood & Jury: 572 (1978); Burtt: 162 (1991); Pimenov & Leonov: 17 (1993).

Annual or biennial herbs. **Leaves** pinnately decompound. **Flowers** in umbels of few short rays or subcapitate, terminal or opposite the leaves; involucre 0 or of up to several bracts and many bracteoles. **Calyx** teeth obsolete to lanceolate. **Petals** usually unequal, oval, with inflected, acuminate apex. **Fruit** ± ovoid, with several prominent ridges and armed with rows of coarse, spreading bristles; mericarps with oil ducts in furrows (under secondary ribs) and in commissural face.

Species 4, Africa; 1 in sthn Afr.: *Agrocharis melanantha* Hochst., widespread in the high-lying eastern parts.

Alepidea F.Delaroche 5922000

(Saniculoideae)

Delaroche: 19 (1808); Sonder: 533 (1862); Dümmer: 7 (1913); Wolff: 94 (1913); Weimarck: 217 (1949); Cannon & Constance: 567 (1978); Burtt: 293 (1982); Townsend: 19 (1989); Burtt: 163, 253 (1991); De Castro & Van Wyk: 345 (1994).

Perennial herbs, rosulate at base with erect flowering stems; usually with strong rootstock. **Leaves** simple, rarely multisect, usually coarsely ciliate or setose on margin; radical ones petiolate; cauline ones sessile. **Flowers** in few-flowered heads usually arranged in panicles; involucral bracts usually coloured and in two rows. **Calyx** with variable lobes. **Petals** erect with long, inflexed apices, keeled on face. **Disc** usually tumid. **Fruit** globose, ovoid or obovoid, scarcely laterally compressed; carpophore reduced, undivided; mericarps convex on back, usually prominently 3-keeled, with keels obtuse, flat on face, with 5 oil ducts, sometimes pustulate. **Seeds** often planoconvex and ribbed on convex side, sometimes without ribs.

Species ± 28, mainly sthn Afr., from the Eastern Cape to the summer-rainfall region; a few extending northwards to Zimbabwe, Kenya and Ethiopia.

*__Ammi__ L. 6016000

(Apioideae)

Linnaeus: 243 (1753); Townsend: 48 (1989); Burtt: 171 (1991); Pimenov & Leonov: 18 (1993).

Robust, erect, annual or perennial herbs; stem sparingly branched and wiry, glabrous; taproot slender. **Leaves** pinnate or bipinnate, with ultimate segments elliptic to broadly obovate, toothed along margins; segments of upper leaves narrower. **Flowers** in large, compound, showy, many-rayed, terminal umbels; involucres conspicuous, of several pinnate bracts. **Calyx** with obsolete teeth. **Petals** ovate, white. **Fruit** narrowly oblong, glabrous, with pale, narrow ribs; oil ducts 6, 4 in furrows, 2 on inner face. **Seeds** dorsally compressed. $x = 10, 11$.

Species 3 or 4, Europe, Asia and Africa; 1 in sthn Afr.: **Ammi majus* L. var. *glaucifolium* (L.) Godron, Lace-plant; cultivated for decorative purposes and has become naturalised in several places in sthn Afr.

Anginon Raf. 5994010

(Apioideae)

Rafinesque: 56 (1840); Sonder: 540 (1862) under *Rhyticarpus*; Schreiber: 8 (1967) as *Sonderina streyi*; Burtt: 90 (1988); Burtt: 172 (1991); Van Wyk *et al.*: 511 (1997); Allison & Van Wyk: 561 (1997).

Woody shrubs or undershrubs, sometimes glaucous. **Leaves** tripinnatisect, often reduced to rachises and/or petioles which are sometimes long, simple and pine needle-like, with or without longitudinal grooves along upper sides. **Flowers** in compound, bracteate umbels. **Calyx** with short, triangular teeth or linear, acute lobes. **Petals** broadly ovate, inflexed at apex, keeled on inner face. **Disc** conical. **Styles** shorter or longer than petals. **Stamens** ± as long as petals. **Fruit** somewhat elliptic, crowned with persistent disc and styles, smooth, rugose or tuberculate but not ribbed or winged; mericarps flat on face, convex on back, a single oil duct in each of 4 furrows and 2 on face, rarely 8–12 around each seed; carpophore bipartite. **Seeds** semiterete.

Species 12, sthn Afr., S Namibia, Northern and Western to Eastern Cape.

Annesorhiza Cham. & Schltdl. 6078000

(Apioideae)

Chamisso & Schlechtendal: 398 (1826); Sonder: 544 (1862); Marloth: 241 (1925); Adamson: 61 (1938); Burtt: 177 (1991); Pimenov & Leonov: 21 (1993).

Biennial or perennial herbs; scapes almost leafless; roots tuberous, usually fleshy, often pencil-like, single or in clusters. **Leaves** radical, usually developing after flowering; sometimes large, petiolate, pinnatipartite or multisect, or pinnate with pinnae lobed; cauline leaves scale-like. **Flowers** in umbels of many rays; involucres of small bracts. **Calyx** with small or obsolete teeth. **Petals** elliptic, with inflexed apex, keeled on face. **Disc** broadly conical or cushion-like. **Fruit** oblong, more than 5 mm long, crowned with calyx teeth and disc, slightly or distinctly winged; mericarps homomorphic or heteromorphic, flat on inner face, prominently veined, when heteromorphic then one 3-ribbed and the other 4-ribbed; ribs sclerified; oil ducts 6, 4 in furrows, 2 on inner face; carpophore bipartite. **Seeds** dorsally compressed, terete or concave-convex in cross section, flat or grooved on face.

Species 12, sthn Afr., widely distributed in South Africa, Lesotho and Swaziland.

*__Anthriscus__ Pers. 5938000

(Apioideae)

Persoon: 320 (1805), name conserved; Townsend: 24 (1989); Burtt: 182 (1991); Pimenov & Leonov: 22 (1993).

Annual, biennial or perennial herbs. **Leaves** bipinnate, tripinnate or sometimes 4-pinnate, fern-like; segments lanceolate to acuminate, toothed, glabrous or somewhat hairy. **Flowers** in sparse, terminal, compound umbels; involucres small or usually absent. **Calyx** 0. **Petals** notched, white. **Fruit** narrowly oblong, slightly 3-angled dorsally, glabrous and shiny at maturity. **Seeds** semiterete and grooved on face. $x = 8$ (7, 9).

Species 10–12, Europe, Asia and Africa; 1 supposedly naturalised in sthn Afr.: **Anthriscus sylvestris* (L.) Hoffm. var. *sylvestris*, KwaZulu-Natal, Lesotho and Eastern Cape.

Apium L. 6004000

(Apioideae)

Linnaeus: 264 (1753); Wollf: 26 (1927); Tutin: 351 (1968); Cannon: 582 (1978); Burtt: 182 (1991); Pimenov & Leonov: 22 (1993).

Annual, biennial, or weak perennial herbs. **Leaves** pinnate to ternately decompound, upper ones becoming sessile. **Flowers** in compound umbels, usually opposite leaves, sessile or shortly pedunculate; involucral bracts 0 or many and foliaceous. **Calyx** teeth obsolete. **Petals** ovate, concave, entire or slightly emarginate, inflexed at apex. **Styles** short, divergent; bases depressed, with entire margins. **Fruit** ovate, laterally flattened, glabrous; mericarps each with 5 longitudinal ribs; oil ducts 4 in furrows and 2 on face. $x = 11$ (7, 8) (polyploidy).

Species 25, cosmopolitan; 4 in sthn Afr., widespread; 1 indigenous: *Apium prostratum* Vent (Sea Celery), along the coast, from the Cape Peninsula (Western Cape) to the Eastern Cape; the naturalised species include **A. graveolens* L., Celery.

Arctopus L. 5926000

(Saniculoideae)

Linnaeus: 1058 (1753); Sonder: 564 (1862); Burtt: 184 (1991); Pimenov & Leonov: 23 (1993).

Acaulescent, perennial herbs with thick rootstock, dioecious. **Leaves** simple, spreading rosette-wise on ground, petiolate, ovate, lobed, with setose margins, mostly spiny on upper surface. **Male flowers** in a compound, stalked umbel, with an involucre of 5–7 spine-tipped bracts; sepals 5, linear-oblong; petals oblong or oblanceolate, with long, inflexed tips; disc flattened; stamens longer than petals; filaments linear; anthers oblong; style 0. **Female flowers** in sessile umbels surrounded by 4(5) connate, spine-tipped bracts; sepals usually 5, spinose-acute, becoming rigid; petals sepallike; styles linear, longer than sepals. **Fruit** ± oblong, usually beaked; carpophore undivided; mericarps flat on inner face, with primary veins spiny, without oil ducts. **Seeds** ± elliptic, flat on one face, slightly convex on other. $x = 9$ (1 report).

Species 3, from Calvinia District (Northern Cape) to Cape Peninsula (Western Cape) and eastwards along the coast to Grahamstown (Eastern Cape).

Berula W.D.J.Koch 6038010

(Apioideae)

Koch: 433 (1826); Sonder: 539 (1862), under *Sium*, in part; Cannon: 598 (1978); Burtt: 185 (1991); Pimenov & Leonov: 27 (1993).

Perennial herbs, robust, glabrous, sometimes aquatic. **Leaves** elongate, once-pinnate; pinnae fairly regular in size, serrate or toothed on margin. **Flowers** in compound umbels; involucres of many persistent bracts. **Calyx** with 5 small teeth. **Petals** obcordate, with an inflexed apex and keeled down inner face. **Stamens** exceeding petals; filaments filiform; anthers oblong. **Styles** terete, subcapitate. **Fruit** ovate or oblong, laterally flattened, indistinctly ribbed; mericarps convex on back, keeled on face, oil ducts 6, set deep in mesocarp, 4 in furrows, 2 on face; carpophore bipartite. **Seeds** subterete. $x = 9$ (6, 10, 11).

Species 1, ± cosmopolitan; 1 subspecies in sthn Afr.: *Berula erecta* (Huds.) Coville subsp. *thunbergii* (DC.) B.L.Burtt, spread almost throughout the region.

Bupleurum L. 5994000

(Apioideae)

Linnaeus: 236 (1753); Sonder: 541 (1862); Burtt Davy: 519 (1932); Burtt: 187 (1991); Pimenov & Leonov: 29 (1993)

Annual or perennial herbs, sometimes undershrubs. **Leaves** ± crowded at base of stem, lax above, entire and grass-like, attentuate to base and sometimes stem-clasping. **Flowers** in compound umbels, with or without bracts. **Calyx** with small or obsolete teeth. **Petals** subcircular, obovate or oblong, ± deeply concave, inflexed at apex, keeled on inner face. **Disc** flat, depressed, rarely subconical. **Stamens** longer than petals. **Styles** very short. **Fruit** ± laterally flattened, sometimes subdidynamous, oblong, crowned with disc; mericarps with 5 acute wings or prominent veins, rarely veins obsolete; oil ducts present or 0; carpophore 2-fid or 2-partite. **Seeds** subterete. $x = 7, 8$ (6, 11) (polyploidy, B-chromosomes).

Species ± 180, mainly Europe, Asia and Africa; 1 in sthn Afr.: *Bupleurum mundii* Cham. & Schltdl.; widespread in the southern, eastern and northeastern parts of sthn Afr.; **B. rotundifolium* L. occurs rarely as an escape in the northern parts of South Africa.

Capnophyllum Gaertn. 6103000

(Apioideae)

Gaertner: 32, t. 85 (1790); Sonder: 562 (1862); Burtt: 188 (1991); Pimenov & Leonov: 31 (1993).

Annual, monoecious herbs. **Leaves** 2- or 3-pinnate, with ultimate segments linear. **Flowers** unisexual, in terminal and lateral umbels; involucres of a few bracts. **Calyx** with 0 or only small teeth. **Petals** elliptic, with inflexed apex. **Disc** cushion-shaped. **Stamens** longer than petals; filaments linear; anthers elliptic, subdidynamous. **Fruit** elliptic in outline, ribbed; mericarps strongly dorsiventrally flattened, convex on back, concave on face and with winged margins, with or without warty ridges; oil ducts 6, 4 in furrows, 2 on face; carpophore 2-partite. **Seeds** ± oblong in cross section. $x = 10$.

Species 2, South Africa; coastal sands of the Northern and Western Cape, from Port Nolloth to Gansbaai.

Chamarea Eckl. & Zeyh. 6020000

(Apioideae)

Ecklon & Zeyher: 346 (1837); Sonder: 538 (1862), under *Carum*; Burtt: 200, 261 (1991); Pimenov & Leonov: 35 (1993).

Perennial herbs with fleshy, tuberous root and slender, leafless scapes. **Leaves** basal, arising after flowering, the first formed ones finely dissected or sometimes pinnate with broad, dentate lobes, the later ones variously dissected, usually finely bi- or triternate, segments dentate. **Flowers** in compound umbels; involucre often absent. **Calyx** with or without minute teeth. **Petals** obovate or elliptic, with long, inflexed apex and keeled inner face. **Disc** shortly conical. **Stamens** slightly shorter than petals; filaments terete; anthers elliptic. **Styles** short. **Fruit** small, ovoid, shorter than 4 mm, usually narrowing towards apex, ribbed; mericarps flat on face, convex on back, with 5 prominent ribs; oil ducts 6, 1 in each furrow, 2 on face; carpophore bipartite. **Seeds** semiterete.

Species 5 or more, widespread in the western, central and southern parts of South Africa and eastwards as far as the Eastern Cape.

Choritaenia Benth. 6129000

(Apioideae)

Bentham: 907 (1867); Burtt: 201 (1991); Pimenov & Leonov: 36 (1993).

Annual, compact, prostrate herbs, very free-flowering. **Leaves** irregularly subternately dissected. **Flowers** in umbels from base and apex of branches; involucres foliaceous. **Calyx** with short, ovate teeth. **Petals** ovate with short, inflexed apex, keeled on face, channelled on back. **Disc** slightly raised, with somewhat undulate margin. **Stamens** as long as petals; filaments filiform; anthers oblong. **Ovary** villous; styles distinct, somewhat linear. **Fruit** circular, somewhat biconvex, crowned with persistent disc and styles, covered with long, stiff, club-shaped hairs mixed with thin hairs; mericarps not separating, convex on back, flat on face, with median rib; oil ducts 9–13, forming separate pockets in wing; carpophore bipartite. **Seeds** linear in cross section.

Species 1, sthn Afr.: *Choritaenia capensis* Benth., widespread in the central and northeastern parts.

Conium L. 5970000

(Apioideae)

Linnaeus: 243 (1753); Sonder: 567 (1862); Hilliard & Burtt: 465 (1985); Burtt: 202 (1991); Pimenov & Leonov: 38 (1993).

Biennial herbs, erect, fairly vigorous; stem maculate or immaculate, with taproot. **Leaves** pinnately decompound, resembling carrot leaves. **Flowers** in dense, compound umbels, with many bracts, rarely unisexual. **Calyx** with obsolete teeth. **Petals** obovate or cuneate, with apex shortly inflexed, keeled on inner face. **Disc** cushion-shaped, divided. **Stamens** longer than petals. **Fruit** broadly ovate or elliptic, slightly laterally flat-

tened; mericarps smooth or with 5 primary, prominent veins, channelled on inner face; oil ducts many, small; carpophore undivided. **Seeds** subterete or flat on one face and slightly convex on the other, channelled on inner face. $x = 11$ (8—1 report)

Species 6, Europe, Africa, Asia; 3 indigenous and widespread in sthn Afr.; one cosmopolitan weed: **Conium maculatum* L., highly poisonous, has been recorded from the Western Cape.

**Coriandrum* L. 5953000

(Apioideae)

Linnaeus: 256 (1753); Cannon: 575 (1978); Burtt: 203 (1991); Pimenov & Leonov: 38 (1993).

Annual herbs, strongly aromatic; stem erect, with slender taproot. **Leaves** pinnate or bipinnate, dimorphic; lower ones with broad, cuneate segments, upper ones with slender, linear segments. **Flowers** in terminal and lateral umbels; involucre inconspicuous or absent. **Calyx** with conspicuous, triangular teeth. **Petals** white to pink, outer ones of outer flowers much enlarged. **Fruit** globose, glabrous, with inconspicuous blunt ribs; oil ducts 0; carpophore bipartite. **Seeds** concave on inner face. $x = 11$ (aneuploids).

Species 2, Europe and Asia; 1 in sthn Afr.: **Coriandrum sativum* L., Coriander; occurs sporadically as an escape in all parts.

**Cyclospermum* Lag. 6004010

(Apioideae)

Lagasca y Segura: 101 (1821), name conserved; Cannon: 582 (1978), as *Apium*; Burtt: 507 (1989c) as *Ciclospermum*; Burtt: 202 (1991) as *Ciclospermum*; Brummitt: 692 (1993).

Annual herbs. **Leaves** 3- or 4-pinnate, with many filiform, glabrous segments; base sheathing. **Flowers** in compound umbels, sessile to pedunculate; involucels 0. **Calyx** teeth obsolete. **Petals** ovate, concave, entire or slightly emarginate, inflexed at apex, white or pale pink. **Styles** very short. **Fruit** broadly elliptic to rounded; mericarps each with 5 longitudinal ribs; oil ducts minute, in furrows and 2 on face.

Species 1: **Cyclospermum leptophyllum* (Pers.) Sprague, a cosmopolitan weed introduced from the Caribbean and central America, widespread in sthn Afr.

Dasispermum Raf. 6069020

(Apioideae)

Rafinesque: 56 (1840); Sonder: 552 (1862), under *Cnidium*; Phillips: 555 (1951), under *Cnidium*; Dyer: 425 (1975), under *Heteroptilis*; Burtt: 93 (1988); Burtt: 204 (1991); Pimenov & Leonov: 43 (1993); Tilney & Van Wyk: 245 (1995).

Flowering as annuals, becoming perennials and somewhat woody at base, decumbent or suberect. **Leaves** mostly pinnatifid or multifid, somewhat fleshy. **Flowers** in compound, terminal or lateral umbels; involucres 0 or of few bracts. **Calyx** with or without short teeth. **Petals** ovate, obovate, or elliptic, with inflexed apex, keeled on face. **Disc** short, conical. **Stamens** longer than petals; filaments subterete; anthers elliptic. **Styles** very short. **Fruit** elliptic, variously winged; mericarps sometimes heteromorphic; usually with 3–5 prominent wings, with a single oil duct under each furrow and 2 on inner face; carpophore bipartite. **Seeds** terete.

Species 1, South Africa: *Dasispermum suffruticosum* (P.J.Bergius) B.L.Burtt; widespread along the South African coastline.

**Daucus* L. 6142000

(Apioideae)

Linnaeus: 242 (1753); Burmann: 8 (1768); Sonder: 563 (1862); Pimenov & Leonov: 43 (1993).

Annual or biennial herbs; stems erect, with stiff, bristle-like hairs; taproot fleshy. **Leaves** bipinnate, lower ones with acute, lanceolate segments, upper ones much smaller and less divided. **Flowers** in terminal umbels; involucre conspicuous, with numerous, narrow, 3-forked bracts. **Calyx** minute. **Petals** broadly obovate, notched, white. **Fruit** elliptic, with sharp bristles. $x = 9, 11$ (6, 8, 10) (polyploidy).

Species 22, Europe, Asia, N Africa, Australia; 1 in sthn Afr.: **Daucus carota* L., the cultivated Carrot; occurs sporadically as an escape and roadside weed.

Deverra DC. 6013000

(Apioideae)

Candolle: 45 (1829); Sonder: 548 (1862); Schreiber: 4 (1967); Cannon: 582 (1978); Pfisterer & Podlech: 571 (1986); Burtt: 205 (1991); Pimenov & Leonov: 44 (1993).

Rigid perennial herbs or broom-like undershrubs. **Leaves** aborted or radical and tripinnately decompound; cauline leaves few or scale-like. **Flowers** in compound umbels; involucres of few bracts or 0. **Calyx** obsolete. **Petals** ovate, inflexed at apex; keeled on face. **Disc** conical, dilated at base with undulate margin. **Stamens** longer than petals; filaments linear; anthers oblong. **Ovary** pilose or scabrid; styles short, thick. **Fruit** elliptic, slightly laterally compressed, pilose, scabrid or scaly; mericarps subterete, with primary veins distinct, flat on face; oil ducts 6, 4 in furrows, 2 on face; carpophore 2-partite. **Seeds** flat on face, convex on back.

Species 7, North Africa to Arabian Peninsula and sthn Afr.; 2 in sthn Afr., widespread except in KwaZulu-Natal.

Diplolophium Turcz. 6054000

(Apioideae)

Turczaninow: 173 (1847); Cannon: 600 (1978); Burtt: 206 (1991); Pimenov & Leonov: 46 (1993).

Robust, erect perennial herbs with solid, finely grooved stems. **Leaves** with large sheathing bases, usually tripinnate or multifid, with ultimate lobes filiform or elliptic. **Flowers** usually in many-rayed umbels; involucres conspicuous, of few to many large, entire bracts. **Calyx** with 5 small or rudimentary teeth. **Petals** inflexed at apex, hairy on outer surface. **Fruit** semiterete, with longitudinal ridges, covered with bristly hairs; mericarps convex on back, usually slightly winged on margins; oil ducts conspicuous, usually 6, 1 in each furrow, 2 or 4 in commissural face; carpophore divided. **Seeds** oblong.

Species 5, tropical Africa; 1 in sthn Afr.: *Diplolophium swynnertonii* (Baker f.) Norman, Northern Province (Venda).

Dracosciadium Hilliard & B.L.Burtt 6016010

(Apioideae)

Hilliard & Burtt: 220 (1986); Burtt: 206 (1991); Pimenov & Leonov: 47 (1993).

Perennial, rhizomatous herbs, subglabrous. **Leaves** palmate or peltate-palmate, margins dentate, radical ones slender-petiolate, upper ones much reduced. **Flowers** in compound umbels. **Calyx** lobes small, triangular. **Petals** broadly elliptic, inflexed at apex. **Disc** hemispherical or conical. **Fruit** on erect or drooping peduncles, ovoid to shortly oblong, laterally flattened, glabrous; oil ducts 6, 1 in each furrow, 2 on face.

Species 2, sthn Afr.; highlying areas of KwaZulu-Natal.

Ezosciadium B.L.Burtt 6020030

(Apioideae)

Burtt: 207, 268 (1991); Pimenov & Leonov: 51 (1993).

Small, erect, annual herbs, sparsely to densely hairy. **Leaves** slender, long-petiolate, ternately dissected, lobes 2- or 3-fid, linear-oblong, acute, margins entire. **Flowers**

in umbels, 1–3(–5) at each node, rays unequal; involucre cauline, umbellules 2–4-flowered. **Petals** very small, white. **Fruit** narrowly oblong, with prominent ridges, sparsely to densely pilose; mericarps with blunt ridges; oil ducts 6, 1 in each furrow and 2 on face.

Species 1, South Africa: *Ezosciadium capense* (Eckl. & Zeyh.) B.L.Burtt, Eastern Cape.

*Foeniculum Mill. 6062000

(Apioideae)

Miller: [513] (1754); Sonder: 548 (1862); Cannon: 605 (1978); Burtt: 207 (1991); Pimenov & Leonov: 53 (1993).

Robust, glabrous, slightly glaucous perennial herbs; stem erect, ribbed. **Leaves** 3- or 4-pinnate, with narrowly linear to narrowly acicular segments; base sheathing. **Flowers** in many-rayed, terminal or lateral umbels; involucre absent. **Calyx** obsolete. **Petals** inflexed at apex, bright yellow. **Disc** short, broadly conical. **Fruit** narrowly ovoid, with prominent ridges at maturity; glabrous; oil ducts 6, large. **Seeds** subterete, grooved. $x = 11$ (8, 10, 13).

Species 5, Europe, Asia, N Africa; 1 in sthn Afr.: **Foeniculum vulgare* Mill., Fennel; cultivated and a widespread roadside weed.

Glia Sond. 6078010

(Apioideae)

Sonder: 547 (1862); Adamson: 618 (1950); Wijnands: 199 (1983); Burtt: 198 (1989a); Burtt: 208 (1991); Pimenov & Leonov: 21 (1993).

Perennial herbs, strongly erect, glabrous. **Leaves** pinnate, variable; basal ones dense, with broad segments; upper ones smaller, with linear segments. **Flowers** in compound, bracteate umbels. **Calyx** 5-toothed, persistent. **Petals** obovate, subemarginate, with inflexed tips, yellow. **Disc** 2-lobed, conical. **Fruit** ovate-oblong, subterete, crowned with stylopodium and spreading styles; mericarps with 5 equal, wing-like ridges, lateral ones marginal; carpophore bipartite. $x = 11$ (1 report).

Species 3, Africa; 1 in sthn Afr.: *Glia prolifera* (Burm.f.) B.L.Burtt; Western Cape: Cape Peninsula and adjacent districts to Caledon.

Hermas L. 5917000

(Hydrocotyloideae)

Linnaeus: 163 (1771); Sonder: 565 (1862); Burtt: 211 (1991); Pimenov & Leonov: 60 (1993).

Robust herbs or undershrubs with tufted habit, monoecious or flowers bisexual. **Leaves** radical or mainly on basal growth, sessile or petiolate, simple, often large and leathery, tomentose or woolly, at least on lower surface. **Flowers** in pedunculate, bracteate, compound, capitate umbels; each umbel with a single, female or bisexual flower surrounded by a number of male flowers, rarely all flowers bisexual. **Calyx** with ovate or lanceolate, persistent lobes. **Petals** somewhat filiform, inflexed at apex. **Disc** flattened. **Styles** terete, longer than calyx lobes. **Fruit** ovate, dorsally flattened or oblong; mericarps orbicular or oblong, flat or convex on back and face, usually deeply channelled on each margin, with 5 or 6 veins and many oil ducts in furrows; dorsal vein often forming a narrow keel. **Seeds** flattened, usually broadly elliptic. $x = 7$ (1 report).

Species 7, Western and Eastern Cape, from Caledon to Uitenhage District.

Heteromorpha Cham. & Schltdl. 5992000

(Apioideae)

Chamisso & Schlechtendal: 385, t. 5 (1826), name conserved; Sonder: 542 (1862); Burtt: 213 (1991); Winter & Van Wyk: 225 (1996).

Shrubs, sometimes small to medium-sized trees or woody climbers, with bark becoming waxy with age, layers peeling in horizontal bands, rarely undershrubs. **Leaves** petiolate, variable; simple or trisect to pinnately and/or palmately compound. **Flowers** in dense, compound, bracteate umbels. **Calyx** with 5 triangular teeth. **Petals** ± elliptic, inflexed, keeled on inner face. **Disc** conical. **Stamens** often longer than petals, inflexed. **Styles** very short. **Fruit** elliptic or somewhat pear-shaped, winged; mericarps of 2 forms, the one 2-winged, the other 3-winged, mostly flattened, with prominent ribs; oil ducts 6 to several, with 2 on face and up to 16 around each seed; carpophore bipartite. **Seeds** subterete.

Species 7, sub-Saharan Africa and Yemen; 5 in sthn Afr., widespread.

Itasina Raf. 6046020

(Apioideae)

Rafinesque: 51 (1840); Sonder: 547 (1862), under *Oenanthe*; Wolff: 139, 369 (1927), under *Thunbergiella*; Burtt: 92 (1988); Burtt: 243 (1991); Pimenov & Leonov: 63 (1993).

Delicate perennial herbs, sometimes appearing annual, glabrous, with fleshy, cylindric roots. **Leaves** basal, filiform or grass-like; cauline, absent or few, narrowly linear. **Flowers** in compound umbels; involucres of few bracts. **Calyx** with ovate-acuminate teeth. **Petals** obovate, with a long, inflexed apex, keeled on face. **Disc** conical. **Stamens** longer than petals; filaments linear; anthers elliptic, subdidynamous. **Styles** spreading, subterete. **Fruit** oblong, ribbed, crowned with persistent styles; mericarps oblong, semiterete, flat on face, with 5 prominent ribs; oil ducts 6, 2 on inner face; carpophore 0. **Seeds** semiterete.

Species 1: *Itasina filifolia* (Thunb.) Raf., Western Cape eastwards to about Humansdorp (SW Eastern Cape).

Lichtensteinia Cham. & Schltdl. 5990000

(Apioideae)

Chamisso & Schlechtendal: 394, t. 5 (1826), name conserved; Sonder: 542 (1862); Burtt: 221 (1991); Pimenov & Leonov: 69 (1993).

Perennial herbs, aromatic, with large rootstock. **Leaves** all in persistent, radical rosette, shortly petiolate, entire, pinnatifid or bipinnatisect, toothed. **Flowers** in compound, bracteate umbels. **Calyx** with 5 thick, ovate, acute lobes. **Petals** elliptic, quadrate or spatulate, with long, inflexed apices, keeled on inner face. **Disc** conical, often mostly connate. **Stamens** ± as long as petals; filaments somewhat fleshy; anthers subdidynamous. **Ovary** smooth or strongly ribbed; styles sometimes minute. **Fruit** ovoid or oblong, nearly terete, crowned with persistent calyx; mericarps semiterete or flattened, flat on one face, convex on other, with 5 primary veins and oil ducts under each; oil ducts absent from furrows and face of mericarps. **Seeds** somewhat flattened, obovate or elliptic, often grooved on back.

Species ± 7, South Africa and 1 on St Helena; widespread along the coastal regions of KwaZulu-Natal, Western and Eastern Cape.

Marlothiella H.Wolff 5996010

(Apioideae)

Wolff: 263 (1912); Schreiber: 7 (1967); Burtt: 225 (1991); Pimenov & Leonov: 73 (1993).

Shrublets up to ± 1 m high, cushion-shaped, gnarled, densely leafy, subsucculent, resiniferous. **Leaves** mostly clustered on short, lateral shoots, pinnate to bipinnate, with sheathing base, thick, fleshy, bright green, with sunken glands. **Flowers** in dense, compound, bracteate umbels; secondary umbels capitate; some central flowers sterile. **Calyx** with ovate-triangular teeth 1.0–1.5 mm long. **Corolla** lobes green, with brownish apex. **Fruit** broadly ovoid, 4–5 mm long, up to ± 2 mm thick; meri-

carps halfmoon-shaped, with minute, mealy indumentum; oil ducts 5, intrajugal, absent on face; carpophore unbranched.

Species 1: *Marlothiella gummifera* H.Wolff; Namibia, along the coast.

Peucedanum L. 6116000

(Apioideae)

Linnaeus: 245 (1753); Linnaeus: 116 (1754); Sonder: 553 (1862); Burtt: 227 (1991); Pimenov & Leonov: 87 (1993).

Perennial herbs or undershrubs, often acaulescent, with taproot. **Leaves** usually 3-pinnate or multifid, with ultimate lobes filiform to ovate, rarely simple and grass-like. **Flowers** usually in many-rayed umbels; involucres of few to many bracts. **Calyx** with 5 small or rudimentary teeth. **Petals** obovate, oblanceolate or cuneate, ± emarginate, inflexed at apex, keeled on face. **Disc** mostly conical, sometimes crenate. **Stamens** slightly longer than petals; filaments subterete; anthers ovate. **Styles** short, thick. **Fruit** dorsally flattened, sometimes biconvex, capped with persistent disc and styles, ribbed, with a narrow, flattened margin, or winged, glabrous; mericarps slightly convex on the back, flat, concave or channelled on face, 3-veined on back, usually winged on margins; oil ducts conspicuous, usually 6, 2 on inner face, rarely 10, and 4 on face; carpophore divided. **Seeds** oblong, linear or planoconvex in cross section. $x = 11$ (6, 9, 10, 13) (polyploidy).

Species ± 120, Eurasia and Africa: 31 or more in sthn Afr., widespread.

Phlyctidocarpa Cannon & W.L.Theob. 5970010

(Apioideae)

Cannon & Theobald: 479 (1967); Schreiber: 7 (1967); Burtt: 240 (1991); Pimenov & Leonov: 88 (1993).

Annual, erect herbs, 0.5–0.6 m tall, glabrous. **Leaves** 3-pinnate, up to 80 mm long, with broad, sheathing base; pinnae linear-lanceolate, remotely toothed. **Flowers** in compound, bracteate umbels, rays 10–30 mm long; peduncles 5–10 mm long; flowers of the terminal umbels bisexual, some of the laterals male. **Calyx** with rudimentary teeth. **Corolla** yellow. **Disc** obsolete. **Fruit** elongate, up to 3 mm long; mericarps semicircular in section, densely covered with rows of cone-shaped papillae; oil ducts large, 1 in each furrow, 2 on face.

Species 1: *Phlyctidocarpa flava* Cannon & W.L.Theob.; endemic to Namibia: Outjo and Kaokoveld.

Pimpinella L. 6033000

(Apioideae)

Linnaeus: 263 (1753); Sonder: 538 (1862); Wolff: 219 (1927); Townsend: 759 (1985); Burtt: 240 (1991); Pimenov & Leonov: 90 (1993).

Perennial herbs, rarely annual. **Leaves** slender-petiolate, radical ones often simple, ovate, cordate, entire or toothed and in succession upwards becoming divided and pinnate. **Flowers** in compound umbels; involucral bracts few or absent, rarely many. **Calyx** with or without teeth. **Petals** obovate or elliptic, inflexed at apex, glabrous, hirsute or villous. **Disc** cushion-shaped or conical. **Stamens** longer than petals; filaments terete; anthers oblong, slightly divided above. **Styles** longer than disc, terete; stigmas subcapitate. **Fruit** ovate in outline or broader than long, slightly laterally flattened, glabrous or hairy, crowned with disc and styles; mericarps flat on face, convex on back, 5-ribbed; oil ducts ± 9, 2 or more in each furrow, 2 on inner face; carpophore 2-fid or 2-partite. **Seeds** semiterete. $x = 9$, 10 (8, 11) (polyploidy).

Species ± 150, ± cosmopolitan; 7 in sthn Afr., northern and eastern parts and southwards to Uniondale and Humansdorp in the Eastern Cape.

Polemannia Eckl. & Zeyh. 6045000

(Apioideae)

Ecklon & Zeyher: 347 (1837), name conserved; Sonder: 550 (1862); Hilliard & Burtt: 225 (1986); Burtt: 242 (1991); Pimenov & Leonov: 92 (1993).

Shrubs or small trees, glabrous. **Leaves** palmately 3-foliolate; leaflets obovate, cuneate, 3-lobed and sometimes serrate, with distinct intramarginal nerve. **Flowers** in compound umbels or umbels in panicles on leafless branches; involucres of few bracts. **Calyx** with persistent, ovate lobes. **Petals** elliptic, entire, inflexed at apex, keeled on inner face. **Disc** conical. **Stamens** slightly longer than petals; filaments terete, anthers elliptic. **Styles** very small. **Fruit** oblong or ovate, flattened; mericarps dorsally flattened, oblong, flat on face, convex on 3-nerved back, winged on margins; oil ducts 6, 2 on inner face; carpophore bipartite. **Seeds** planoconvex in cross section.

Species 3, sthn Afr.: E Free State, high-lying areas of KwaZulu-Natal, Lesotho, and Eastern Cape.

Polemanniopsis B.L.Burtt 6045010

(Apioideae)

Burtt: 498 (1989b); Burtt: 243 (1991); Pimenov & Leonov: 92 (1993).

Robust, multistemmed, summer-deciduous shrubs, glabrous. **Leaves** palmately 3- to 5-foliolate; leaflets obovate, serrate. **Flowers** bisexual or some male (plant andromonoecious), in compound umbels, usually terminal; involucres of few bracts, falling before flowering. **Calyx** with persistent, triangular lobes. **Petals** ovate-acuminate, inflexed at apex. **Disc** fleshy, dark coloured. **Fruit** large, oblong, 5-winged, wings hollow; mericarps markedly heteromorphic, one 2-winged, the other 3-winged; oil ducts indistinct, within wings when present; carpophore bipartite. **Seeds** narrowly ellipsoid, grooved on face, lying loose within the pericarp.

Species 1: *Polemanniopsis marlothii* (H.Wolff) B.L.Burtt, Richtersveld (Northern Cape) and also Clanwilliam District (Western Cape).

Sanicula L. 5918000

(Saniculoideae)

Linnaeus: 235 (1753); Sonder: 533 (1862); Cannon: 565 (1978); Burtt: 245 (1991); Pimenov & Leonov: 99 (1993).

Perennial herbs, sometimes monoecious. **Leaves** mainly radical and few cauline, often long-petiolate, mainly tripartite or palmately partite, rarely pinnate. **Flowers** unisexual or bisexual, sometimes both kinds in same inflorescence, in simple or compound, bracteate umbels, rarely umbels in racemes. **Calyx** with lanceolate lobes; lobes free in bisexual flowers and somewhat connate in unisexual flowers. **Petals** ± emarginate and strongly inflexed. **Disc** flat or saucer-shaped. **Filaments** strongly inflexed, longer than petals. **Fruit** covered with hooked spines; styles terete, rarely thickened; carpophore 0; mericarps broad or narrow on inner face, smooth or sometimes setose or granulate, oil ducts 5, below veins or with 2 oil ducts on inner face. **Seeds** flat or swollen and halfmoon-shaped, often deeply concave or grooved on face. $x = 8$ or 4 (high polyploidy).

Species ± 39, more or less cosmopolitan, 1 in sthn Afr.: *Sanicula elata* D.Don, widespread along the eastern parts and along the Cape coastal region to Cape Peninsula.

Sium L. 6038000

(Apioideae)

Linnaeus: 251 (1753); Sonder: 539 (1862) in part, *S. thunbergii* transferred to *Berula*; Cannon: 598 (1978); Burtt: 247 (1991); Pimenov & Leonov: 105 (1993).

Robust herbs in wet places, glabrous. **Leaves** elongate, once-pinnate, with pinnae appearing finely and regularly

serrate on margins, teeth curved inwards and often slightly overlapping. **Flowers** in compound, bracteate umbels; involucres and involucels conspicuous. **Calyx** with 5 small or obsolete teeth. **Petals** obcordate, with inflexed apex, white. **Styles** with depressed or slightly conical base, spreading or recurved above. **Fruit** laterally flattened or contracted, subdidymous; mericarps with 5 ridges; oil ducts 6, 4 in furrows, 2 on face; carpophore bipartite. **Seeds** subterete. $x = 6$ (8, 9, 10, 11, 13) (polyploidy).

Species 14, ± cosmopolitan; 1 in sthn Afr.: *Sium repandum* Welw. ex Hiern, widespread in the northern and eastern parts and southwards to the Eastern Cape; readily confused with *Berula*.

Sonderina H.Wolff 6017010

(Apioideae)

Wolff: 92 (1927); Adamson: 620 (1950); Burtt: 248 (1991); Pimenov & Leonov: 106 (1993).

Annual herbs. **Leaves** 1- or 2-pinnatisect or subtripinnate, with narrow segments. **Flowers** in compound umbels; involucres of a few, narrow bracts. **Calyx** of small or obsolete teeth. **Petals** obovate or subquadrate, with bifid or emarginate, inflexed tip, keeled on inner face. **Disc** cushion-like. **Stamens** longer than petals; filaments filiform; anthers ovate-oblong. **Styles** slender, ± as long as ovary; stigmas subcapitate. **Fruit** slightly flattened, ovate or oblong, minutely scabrid, or hispid; mericarps with 5 ribs, flat on face, or channelled, convex on back; oil ducts 6, 1 in each furrow and 2 on face; carpophore bipartite. **Seeds** terete. $x = 9$ (1 report).

Species 4, South Africa: KwaZulu-Natal, Northern, Western and Eastern Cape, but mainly western area.

Steganotaenia Hochst. 6116010

(Apioideae)

Hochstetter: 4 (1844); Norman: 514 (1934); Schreiber: 8 (1967); Cannon: 617 (1978); Burtt: 249 (1991); Pimenov & Leonov: 108 (1993).

Trees up to ± 6 m tall, with somewhat waxy bark. **Leaves** crowded at ends of branches, petiolate, pinnate; leaflets ovate, acuminate, setose on margins. **Flowers** bisexual or male, in compound umbels; involucres of a few bracts. **Calyx** with small teeth. **Petals** obovate, with long, inflexed apex, keeled on face. **Stamens** longer than petals; filaments terete; anthers oblong. **Male flowers** with disc cushion-shaped and rudimentary styles. **Bisexual flowers** with disc slightly concave; ovary obovate; styles terete, ± half as long as stamens. **Fruit** flattened, obovate in outline, ribbed, winged; mericarps convex on back, with 3 prominent, acute veins, winged on margin, flat on face, with narrow, apical channel; oil ducts inconspicuous; carpophore bipartite. **Seeds** planoconvex.

Species 2, Africa; 1 in sthn Afr.: *Steganotaenia araliacea* Hochst., northern parts of Namibia and Botswana, Northern Province and Mpumalanga.

Stenosemis E.Mey. ex Sond. 6078020

(Apioideae)

Sonder: 551 (1862); Burtt: 324 (1979); Burtt: 207 (1989a); Burtt: 250 (1991); Pimenov & Leonov: 108 (1993).

Perennial herbs with woody base; stems procumbent, glabrous, distinctly ribbed. **Leaves** slender, much dissected, 3-pinnate to multifid, ultimate lobes nearly terete, oblong to filiform. **Flowers** in terminal, bracteate, multi-rayed umbels on long peduncles. **Calyx** small, with narrowly triangular teeth. **Petals** obovate, subemarginate, with inflexed tips, yellow. **Disc** shortly conical. **Styles** slender, much longer than petals. **Fruit** roundish ovate, subterete, crowned with stylopodium and spreading styles; mericarps with 5 wing-like ridges, wings thick, corky, undulate; oil ducts 6, 4 in the furrows and 2 on face.

Species 2, South Africa; S KwaZulu-Natal to Eastern Cape.

Stoibrax Raf. 6014010

(Apioideae)

Rafinesque: 52 (1840); Sonder: 538 (1862), under *Ptychotis*; Burtt: 145 (1989d); Burtt: 250 (1991); Pimenov & Leonov: 108 (1993).

Annual decumbent herbs, glabrous. **Leaves** 2- or 3-pinnate, with many filiform, glabrous segments. **Flowers** in compound umbels, pedunculate, with 10 to 16 rays; involucral bracts pinnatifid. **Flowers** very small. **Petals** white. **Styles** very short. **Fruit** broader than long, distinctly 2-lobed (didymous), minutely tuberculate; mericarps ovate, with 5 longitudinal ribs on each. $x = 10$ (1 report).

Species 5, Europe and Africa; 1 in sthn Afr.: *Stoibrax capense* (Lam.) B.L.Burtt (= *Sonderina didyma* (Sond.) Adamson), Namaqualand (Northern Cape) to Cape Agulhas (Western Cape).

Torilis Adans. 5945000

(Apioideae)

Adanson: 99 (1763); Sonder: 564 (1862); Burtt: 251 (1991); Pimenov & Leonov: 113 (1993).

Annual herbs. **Leaves** pinnately compound, resembling carrot leaves. **Flowers** in umbels opposite leaves; umbels compound with few rays; involucre absent; corolla larger on outside flowers than on inner ones. **Calyx** of 5 small, acute teeth, persistent. **Petals** obovate, emarginate, with inflexed point, white. **Fruit** grooved at sides, covered with stiff, straight bristles; mericarps circular in section, without ridges. $x = 6$ (8, 11) (polyploidy).

Species ± 15, Africa and adjacent areas; 1 doubtfully indigenous to South Africa: *Torilis arvensis* (Huds.) Links (= *T. africana* (Thunb.) Spreng.), mostly in the Cape coastal districts; another species, **T. nodosa* (L.) Gaertn., occurs sporadically as an escape.

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Apocynaceae (in broad sense)

(Asteridae—Gentianales)

Compiled by J.E. Victor, C.L. Bredenkamp, H.J.T. Venter, P.V. Bruyns & A. Nicholas

Trees, erect or scandent shrubs, shrublets, subshrubs, lianas, perennial, rarely annual herbs, often succulents, glabrous or pubescent, with milky or clear sap. **Leaves** opposite, sometimes whorled or decussate, rarely alternate or fascicled, simple, entire, pinnately veined, in some succulents reduced to small rudiments or spines; stipules, if present, usually intrapetiolar, rarely on each side of petiole, minute to short, rarely spinose; colleters (mucilaginous hairs) often present at junction of petiole and lamina. **Inflorescence** mostly a cyme, sometimes racemose or umbelliform, terminal to axillary, sometimes flowers solitary. **Flowers** regular, bisexual, small to large and showy, usually bracteolate, sometimes fragrant, occasionally with an obnoxious smell. **Calyx** of 5(4) sepals, free or slightly united at base, rarely forming a tube; mostly with paired, ± alternisepalous, basal, adaxial colleters. **Corolla** gamopetalous, 5(4)-lobed to 5(4)-fid, rotate to tubular; lobe aestivation dextrorse (overlapping to the right) or sinistrorse (to the left) or valvate; a corolline corona sometimes present. **Corona** of 5 or more, free or fused lobes in 1 or 2(3) series often present, either on corolla or arising from or near base of staminal column. **Disc** annular or cupular or of 2–5 scales usually present in Apocynoideae. **Stamens** 5(4), either arising on corolla tube and alternating with petals, or conniving in a cone around style head, or fused into a tubular staminal column (gynostegium) with anthers fused to style head; anthers 2-thecous, either 2- or 4-locular, sometimes with apical appendix, tailed at base or winged; pollen grains in monads, tetrads or united into waxy pollen masses (pollinia), dispersed singly, in translators or in pollinaria comprising 2 or 4 pollinia attached by caudicles (translator arms) to a corpuscle (corpusculum, clip, gland, pollen carrier). **Nectary**, if present, in a ring around base of ovary or in 5 alternisepalous troughs at base of filaments or staminal column. **Ovary** superior to half-inferior, of 2 carpels, either entire and 1- or 2-locular with (1–4) or many ovules on an axile placenta, or carpels ± free to partly connate, each carpel with (1)–many ovules on a single, ventral, marginal placenta; style 1 or carpels ± free except towards base and towards apex and dilated at apex into style head comprising anthers. **Fruit** a berry, drupe, samara, or a pair (often 1 by abortion) of ventrally dehiscent follicular or baccate mericarps. **Seeds** often compressed, often with a tuft of silky hair (coma) at micropylar end, sometimes with marginal wing; embryo straight; endosperm present.

Genera 480, species 4800, mostly tropical and warm (especially Africa), few in temperate regions; sthn Afr.: genera 90, species ± 696. **Vinca minor* L., Periwinkle and **Plumeria rubra* L., Frangipani, both widely cultivated ornamentals, have not been recorded as garden escapes.

Leeuwenberg: 1213 (1994); Liede & Albers: 201 (1994); Struwe *et al.*: 175 (1994); Takhtajan: 434 (1997); Venter & Verhoeven: 705 (1997).

Apocynaceae, as circumscribed here, includes Asclepiadaceae and Periplocaceae.

Key to subfamilies

1a Anthers free from style head; corolla lobe aestivation in bud typically sinistrorse (overlapping to the left), rarely dextrorse (overlapping to the right); fruit dehiscent or indehiscent, syncarpous or apocarpous, a berry, drupe, follicle or capsule; seeds naked, with wings, or arils, but almost never with a tuft of hairs ..... **Plumerioideae** (p. 72)

1b Anthers adnate or ± adherent to style head; corolla lobe aestivation in bud typically dextrorse or valvate, rarely sinistrorse; fruit dehiscent, almost always apocarpous, a pair of follicles, sometimes reduced to one by abortion or postgenitally fused; seeds small, compressed, almost always with a coma (tuft of hairs) at one end:

2a Anthers 4-locular, adherent to style head by hairs or secretions, lower part often sterile; filaments free; pollen shed as monads; nectaries, if present, in a ring around base of ovary ..... **Apocynoideae** (p. 73)

2b Anthers 2- or 4-locular, adnate to style head (if adherent by hairs or secretions then pollen gathered in 4 small pollinia — Secamonoideae), fertile throughout; filaments free or fused; pollen shed in tetrads into translators or gathered in 2(4) pollinia attached to the corpuscle; nectaries located in alternistaminal troughs at base of filaments or staminal column:

3a Pollen shed in tetrads into spoon-shaped translators with a sticky end which can adhere to a pollinator for removal; anthers 4-locular ..... **Periplocoideae** (p. 73)

3b Pollen gathered in pollinia attached in pairs (or 4s) to a ± spherical corpuscle which can become attached to a pollinator for removal; anthers 2- or 4-locular:

4a Anthers 4-locular; pollen gathered in 4 small pollinia attached to a soft, pale corpuscle ..... **Secamonoideae** (p. 74)

4b Anthers 2-locular; pollen gathered in 2 pollinia attached to a dark, hard corpuscle ..... **Asclepiadoideae** (p. 74)

Subfamily **Plumerioideae**

Herbs, subshrubs, tendrilous lianes or trees, mostly with milky sap; indole alkaloids often present. **Flowers** often fragrant. **Corolla**: lobe aestivation almost always sinistrorse; rarely corona present in mouth. **Disc** annular, cup-shaped, of 2 glands or absent. **Stamens**: filaments ± free, usually short, arising on corolla tube; anthers 4-locular, mostly entirely fertile, free from style head; pollen in monads, 3- or 4-colporate. **Nectary** in ring around base of ovary. **Ovary** superior to slightly inferior, entire and 1- or 2-locular, with 1–4(more) ovules per locule, or consisting of 2 distinct, partly fused, usually many-seeded carpels; style 1, ending in a ± enlarged style head (pistil head) with a nonreceptive stigmoid apex and a true stigma on the cylindrical part underneath. **Fruit** syncarpous or apocarpous, a berry, drupe or a pair (or 1 by abortion) of follicular mericarps. **Seeds** ± ovoid to flattened, sometimes winged, often ruminate, glabrous, without a coma (tuft of hairs).

Schumann: 122 (1895); Leeuwenberg: 1219 (1994); Takhtajan: 434 (1997).

Classification of Plumerioideae

1. Tribe **Carisseae**: *Acokanthera*, *Ancylobothrys*, *Carissa, Landolphia*
2. Tribe **Tabernaemontaneae**: *Callichilia*, *Tabernaemontana*, *Voacanga*
3. Tribe **Plumerieae**: **Catharanthus*, *Diplorhynchus*, *Gonioma*
4. Tribe **Alyxieae**: *Rauvolfia*

Key to genera of Plumerioideae

1a Ovary entire:

2a Ovary 2-locular, with 1–4, rarely many, ovules in each; shrubs or trees, rarely scandent:

3a Unarmed shrubs or trees; inflorescence axillary ..... **Acokanthera**

3b Armed shrubs, sometimes scandent; inflorescence terminal or pseudo-axillary ..... **Carissa**

2b Ovary 1(2)-locular, with many ovules; woody climbers or rarely shrubs:

4a Inflorescence of elongate, branched, terminal panicles ..... **Ancylobothrys**

4b Inflorescence contracted, short and often clustered, terminal or axillary ..... **Landolphia**

1b Ovary of 2 separate or almost separate carpels:

5a Stems subherbaceous, not taller than 1.5 m ..... ***Catharanthus**

5b Stems woody; shrubs, trees or climbers:

6a Fruit baccate or drupaceous:

7a Fruit a drupe; ovules 2 in each carpel ..... **Rauvolfia**

7b Fruit baccate; ovules many in each carpel:

8a Calyx divided almost to base:

9a Fruit of 2 large, subglobose mericarps; corolla tube shorter than 10 mm ..... **Tabernaemontana**

9b Fruit syncarpous, bilobed; corolla tube longer than 10 mm ..... **Callichilia**

8b Calyx with distinct tube which is circumscissile at base ..... **Voacanga**

6b Fruit follicular:

10a Ovules many in each carpel; leaves oblong to oblanceolate; fruit longitudinally striate ..... **Gonioma**

10b Ovules 2–4 in each carpel; leaves usually broadly ovate-elliptic; fruit lenticellate ..... **Diplorhynchus**

Subfamily **Apocynoideae**

Trees, erect or scandent, sometimes succulent shrubs or woody climbers, mostly with milky sap; glycosides often present. **Stipules** occasionally spinose. **Flowers** usually fragrant. **Corolla**: lobe aestivation almost always dextrorse; sometimes with scales, protuberances, ridges or corona in mouth. **Disc** annular or cupular or of 2–5 scales, sometimes ± adnate to ovary, rarely 0. **Stamens** usually included; filaments ± free, arising on corolla tube, often very short; anthers conniving in a cone around style and ± adherent to style head, 4-locular, mostly fertile only near apex, often with an apical appendage, sometimes united at tip; pollen shed in monads, 3- or 4-porate. **Nectary** in a ring around base of ovary. **Ovary** superior to slightly inferior; carpels 2, partly fused, with many ovules; style 1, entire or divided at base, ending in a ± enlarged style head (pistil head) with a nonreceptive stigmoid apex and a true stigma on cylindrical part underneath. **Fruit** of 2 follicular mericarps. **Seeds** many, generally with a coma (tuft of hairs), not ruminate.

Jussieu: 143 (1789); Stapf: 490 (1907); Codd: 244 (1963); Huber: 1 (1967a); Leeuwenberg & Kupicha *et al.*: 395 (1985); Leeuwenberg: 1213 (1994); Struwe *et al.*: 175 (1994).

Classification of Apocynoideae

1. Tribe **Echiteae**: *Pachypodium*
2. Tribe **Wrightieae**: *Adenium, Holarrhena, *Nerium, Strophanthus, Wrightia*
3. Tribe **Apocyneae**: *Baissea, Oncinotis*

Key to genera of Apocynoideae

1a Leaves opposite or ternate; stems woody or subherbaceous:
  2a Corolla ± salver-shaped:
    3a Corolla without appendages in throat; leaves broadly elliptic ..... **Holarrhena**
    3b Corolla with scales or appendages in throat; leaves lanceolate, oblong or oblanceolate:
      4a Woody climbers; leaves oblong to oblanceolate; scales in corolla throat free ..... **Oncinotis**
      4b Trees or shrubs; leaves lanceolate; scales in corolla throat forming a short corona ..... **Wrightia**
  2b Corolla tube campanulate to broadly funnel-shaped:
    5a Corona absent ..... **Baissea**
    5b Corona present:
      6a Corona reduced to paired appendages alternating with corolla lobes ..... **Strophanthus**
      6b Corona of 5 truncate epipetalous parts, each 3–8-lobed ..... ***Nerium**
1b Leaves alternate or fascicled; stems succulent:
  7a Stipules minute or absent; anthers produced into long, hairy appendages ..... **Adenium**
  7b Stipules transformed into rigid spines; anthers with only a short, terminal appendage ..... **Pachypodium**

Subfamily **Periplocoideae**

Climbers, erect to scrambling shrubs or shrublets, or geophytic herbs with watery or milky sap; roots often tuberous. **Leaves** with interpetiolar lines, ridges or clustered colleters adaxially at juncture of petiole and blade. **Flowers** often fragrant. **Calyx** persistent. **Corolla**: lobe aestivation usually dextrorse. **Corona** double; outer corona of 5 free or fused, epipetalous lobes; inner corona of free or fused interstaminal discs. **Stamens**: filaments free or fused to outer or inner corona; anthers 4-locular, fused to style head, nearly horizontal to ascending, connectives apically pronounced, apiculate or variously shaped, connivent over style head; pollen shed in T-shaped to rhomboidal, decussate or linear tetrads. **Nectaries** in 5 alternisepalous troughs at base of filaments. **Ovary** half-inferior; carpels 2, free except towards base and at apex where they are fused and dilated into style head with 5 embedded, semi-erect to erect translators consisting of spoon- to cornet-shaped receptacle (into which pollen is shed), with small sticky viscidium at lower end (which may become attached to pollinator); style head enclosed in corolla tube or exposed from it. **Fruit** a pair of cylindrical-ovoid follicles or a solitary follicle by abortion. **Seeds** many, compressed, obliquely ovate to oblong, with micropylar coma (tuft of hairs), seldom with a ring of hairs or a membranous wing.

Schlechter: 23 (1924); Brown: 518 (1907) under Asclepiadaceae; Bullock: 503 (1957); Huber: 1 (1967b); Liede: 233 (1997); Venter & Verhoeven: 705 (1997); Verhoeven & Venter: 1 (1998).

Classification of Periplocoideae

1. Tribe **Periploceae**: *Mondia, Petopentia, Tacazzea*
2. Tribe **Gymnanthereae**: *Raphionacme*
3. Tribe **Cryptolepideae**: *Cryptolepis, Ectadium, Stomatostemma*

Key to tribes of Periplocoideae

1a Corolla open, rotate, lobed almost to its base; stamens and outer corona inserted at corolla base; gynostegium completely exposed ..... **Periploceae**
1b Corolla tube well defined and broadly campanulate to cylindrical; stamens and outer corona inserted within tube, from base to mouth; gynostegium enclosed within corolla tube or exserted:
  2a Stamens and outer corona arising at mouth of corolla tube ..... **Gymnanthereae**
  2b Stamens inserted from base to middle of corolla tube; outer corona arising anywhere from base to mouth of tube ..... **Cryptolepideae**

Key to genera of Periplocoideae

1a Gynostegium exserted from the corolla mouth:
2a Corolla campanulate with distinct tube; erect, prostrate or climbing herbaceous geophytes with suffrutescent stems…..... **Raphionacme**
2a Corolla rotate with tube indistinct; woody lianes with perennial stems:
3a Corona lobes broadly ovate; stems with interpetiolar, frill-like stipules..... **Mondia**
3b Corona lobes filiform; stems with interpetiolar lines or dentate ridges:
4a Corolla lobes narrowly triangular to triangular-ovate with acuminate apex; leaves glabrous, glossy..... **Petopentia**
4b Corolla lobes broadly ovate to oblong-ovate with obtuse apex; leaves adaxially glabrous to puberulous, abaxially tomentose..... **Tacazzea**
1b Gynostegium enclosed in the corolla tube:
5a Corona lobes arising at the middle or lower down on the corolla tube..... **Cryptolepis**
5b Corona lobes arising at corolla mouth:
6a Corolla trumpet-shaped, pale green to yellow; corona lobes subulate; anthers hairy..... **Ectadium**
6b Corolla broadly campanulate, creamy white with centre maroon to violet; corona lobes clavate; anthers glabrous…..... **Stomatostemma**

Subfamily **Secamonoideae**

Shrubby climbers with milky sap. **Leaves** with few colleters at juncture of petiole and blade. **Corolla**: lobe aestivation dextrorsely contorted or valvate; corolline corona of 5 fleshy ridges usually present near mouth of tube. **Stamens** with filaments fused into a tubular staminal column (gynostegium) enclosing gynoecium; anthers 4-locular, erect to ± horizontal, adaxially fused to sides of style head; lateral margins of adjacent anthers forming distinct gynostegial grooves (guide rails or anther slits); pollen in 4 minute pollinia (2 per theca); pollinia ± erect, attached by ± obsolete caudicles to soft, white corpuscle usually larger than pollinia. **Corona (gynostegial)**: outer corona rarely present as small ridge beneath gynostegial grooves, inner arising at or slightly below base of anthers. **Nectary** in 5 alternisepalous troughs. **Ovary** half-inferior; style head broad, with 5 presumed stigmatic areas on sides of lower cylindric part. **Fruit** a pair of fusiform, ventrally dehiscent follicles. **Seeds** many, flattened, with micropylar coma (tuft of hairs).

Takhtajan: 434 (1997).

Only genus in sthn Afr..... **Secamone**

Subfamily **Asclepiadoideae**

Perennial herbs, subshrubs, shrublets or shrubs, often twining or scrambling, often succulent, with clear or milky sap. **Leaves** sometimes reduced to small rudiments or spines. **Corolla** rotate to tubular; aestivation in bud typically dextrorse or valvate. **Stamens** with filaments fused into a tubular staminal column (gynostegium) enclosing gynoecium; anthers adaxially fused to style head; anthers 2-locular, spreading, erect or ± horizontal, with lateral margins of adjacent anthers forming distinct gynostegial grooves (guide rails or anther slits); pollen gathered in pollinia, 1 per theca, with waxy outer wall; pollinia attached in pairs (one each from adjacent anthers) by a flexible, translucent caudicle (translator arm) to a small, spherical, hard, brown to black corpuscle (corpusculum, carrier, translator, retinaculum, gland, pollen carrier or clip), to form a pollinarium. **Corona**: outer corona of 5 lobes, frequently present at or near base; inner corona usually at or just below base of anthers, usually of 5 lobes. **Nectary** in 5 alternisepalous troughs. **Ovary** superior (half-inferior), of 2 apocarpous carpels; style head broad, often with flat or convex apex with 5 presumed stigmatic zones located on sides of lower cylindrical part behind gynostegial grooves. **Fruit** a pair (often only 1 by abortion) of ventrally dehiscent follicles with dry pericarp; in Ceropegieae generally with delayed development. **Seeds** many, flattened, often with wing-like margins, mostly with micropylar coma (tuft of hairs).

Brown: 295 (1902); Brown 385 (1903); Brown: 518 (1907); Brown: 673 (1908); Brown: 685 (1909); Huber: 1 (1967c).

The hybrid genus × *Hoodiapelia* is not included.

Classification of Asclepiadoideae

1. Tribe **Asclepiadeae**: **Araujia, Asclepias, Aspidoglossum, Aspidonepsis, Astephanus, *Calotropis, Cordylogyne, Cynanchum, Eustegia, Fanninia, Gomphocarpus, Kanahia, Microloma, Miraglossum, Oncinema, Pachycarpus, Parapodium, Pentarrhinum, Pergularia, Periglossum, Sarcostemma, Schizoglossum, Stathmostelma, Stenostelma, Woodia, Xysmalobium*
2. Tribe **Marsdenieae**: *Fockea, Marsdenia, Rhyssolobium, Sphaerocodon, Stigmatorhynchus, Telosma, Tylophora*
3. Tribe **Ceropegieae** (= Stapelieae): *Anisotoma, Brachystelma, Caralluma, Ceropegia, Duvalia, Emplectanthus, Hoodia, × Hoodiopsis, Huernia, Lavrania, Macropetalum, Notechidnopsis, Ophionella, Orbea, Orbeanthus, Orbeopsis, Orthanthera, Pachycymbium, Pectinaria, Piaranthus, Quaqua, Riocreuxia, Sisyranthus, Stapelia, Stapeliopsis, Tavaresia, Tenaris, Tridentea, Tromotriche*

Key to tribes of Asclepiadoideae

1a Pollinia developing in part of anther below position of corpuscle..... **Asclepiadeae** (key on p. 75)
1b Pollinia developing in part of anther above position of corpuscle:

2a Pollinia with insertion crest (ridge along edge of pollinium that becomes lodged in guide rail and through which pollen tubes arise) ..... **Ceropegieae** (key on p. 76)

2b Pollinia without insertion crest:

3a Carpels narrowing gradually into slender neck below style head; anther appendages with basal horizontal slit..... ..... **Asclepiadeae** (key below)

3b Style head sessile on carpels that lack slender neck; anther appendages without basal horizontal slit..... ..... **Marsdenieae** (key on p. 76)

Note: In this key and in the descriptions below, the parts of the pollinium (e.g. inner side, outer side) are labelled relative to the anther in which the pollinium has arisen.

Key to genera of Asclepiadeae

1a Corona absent on staminal tube; plant with clear sap:

2a Corolla lobes closing tube at bases or remaining closed over mouth of tube; anther appendages covering whole of style head, mostly with apical tuft of hairs..... **Microloma**

2b Corolla lobes not closing corolla tube; anther appendages only covering base of style head, without apical tuft of hairs.. ..... **Astephanus**

1b Corona present on staminal tube; plant with clear or milky sap:

3a Style head produced beyond anthers into elongated cone bifid near apex; corona lobes behind anthers with margins folded backwards:

4a Corolla less than 10 mm in diameter, tube not swollen towards base; plant with clear sap..... **Oncinema**

4b Corolla more than 15 mm in diameter, tube swollen towards base; plant with milky sap..... ***Araujia**

3b Style head and corona not as above:

5a Corona consisting of 20 free lobules of ± equal length and 5 slightly shorter lobules adpressed to backs of anthers; pollinarium with caudicles rising up alongside corpuscle and then spreading and descending to pollinia; small erect herbs with clear sap ..... **Eustegia**

5b Corona not as above; caudicles spreading and descending to pollinia; if small erect herb then with milky sap:

6a Corona consisting of ± uniformly tall outer series of fused lobes encircling gynostegium, often with inner series of 5 lobes adpressed to backs of anthers:

7a Outer coronal series ± cupular near base of gynostegium, much shorter than and separated from inflated vesicular inner lobes adpressed to backs of anthers..... **Sarcostemma**

7b Outer coronal series cupular to tubular, sometimes divided nearly right to base but equalling or exceeding gynostegium, fused to inner lobes if these present ..... **Cynanchum**

6b Corona consisting of very small lobes beneath guide rails (sometimes absent) and very much larger (usually heavily vascularised) lobes behind anthers, these often with adaxial outgrowths or keels spreading towards style head:

8a Stems twining:

9a Corolla with microscopic hairs inside, ± entirely without tube; corona ± absent beneath guide rails, lobes behind anthers with incurved margins; pollinia attached by slender caudicles, without insertion crest..... ..... **Pentarrhinum**

9b Corolla with conspicuous hairs towards edges of lobes, with cupular tube below insertion of corona; corona with 5 discrete lobes beneath guide rails, lobes behind anthers without incurved margins; pollinia attached by caudicles much shorter than broad, with insertion crest along inner edge ..... **Pergularia**

8b Stems erect, decumbent or prostrate, mainly herbaceous; rootstock often tuberous:

10a Anther appendages ascending and covering style head; style head conical above..... **Stenostelma**

10b Anther appendages adpressed to sides of style head but not covering it; style head concave above with slight central depression:

11a Pollinaria with very ornate caudicles considerably longer and broader than pollinia ..... **Stathmostelma**

11b Pollinaria with caudicles much shorter and narrower than pollinia:

12a Corona (behind anthers) arising from staminal tube but fused to corolla tube for considerable distance towards sinuses of corolla lobes ..... **Parapodium**

12b Corona (behind anthers) arising from staminal tube and not fused to corolla tube:

13a Corona lobes (behind anthers) fleshy and solid, without keel or process on ventral surface .. **Xysmalobium**

13b Corona lobes (behind anthers) dorsiventrally flattened or with margins folded inwards:

14a Corona lobes (behind anthers) dorsiventrally flattened, lateral margins not folded inwards to form cavity, sometimes keeled adaxially:

15a Corona lobes (behind anthers) spreading horizontally or curving outwards from base, with keels on inner face; usually fairly robust perennials ..... **Pachycarpus**

15b Corona lobes (behind anthers) erect from base:

16a Petals white, flowers rather showy, in few-flowered, terminal umbels; corona lobes linear-oblong, purple; somewhat delicate perennial herbs ..... **Fanninia**

16b Petals rarely white; corona lobes not as above:

17a Corona lobes (behind anthers) deeply trifid or quadrate with square shoulders, with an incurved midlobe and incurved margins at base ascending the column as narrow wings; usually single-stemmed perennial herbs..... **Woodia**

17b Corona lobes ± spathulate or lanceolate, sometimes produced into a point, usually keeled or with processes on inner surface:

18a Flowers in dense, globose, pedunculate heads; corolla lobes suberect, corona lobes spathulate or hastately subspathulate, usually with 2 keels capped by a transverse ridge or tubercle on inner face:

19a Corona lobes hastately subspatulate; marsh-loving ..... **Cordylogyne**

19b Corona lobes spatulate; slender grassland herbs ..... **Periglossum**

18b Flowers in sessile or pedunculate umbels; corona lobes often produced into a subulate or filiform apex, usually with 2 keels and frequently with 1 or 2 appendages on inner face:

20a Inflorescence pedunculate (except in *S. bidens* subsp. *pachyglossum*); pollinia medially attached to caudicle with pellucid zone on outer side ..... **Schizoglossum**

20b Inflorescence sessile; pollinia subapically attached, usually without germination zone (if this present then located at point of attachment of pollinia to caudicle):

21a Corona lobes fleshy; pollinia without pellucid zone ..... **Miraglossum**

21b Corona lobes thin; pollinia often with pellucid zone ..... **Aspidoglossum**

14b Corona lobes (behind anthers) flat, with lateral margins folded forwards at least in part (usually strongly) to form cavity (i.e. cucullate or complicate), with or without processes within cavity:

22a Axils of leaves with minute bristles; flowers developing in gradual succession, spirally arranged around elongating top of peduncle ..... **Kanahia**

22b Axils of leaves without bristles; inflorescences umbellate (flowers radiating from single point) with flowers all opening ± simultaneously:

23a Plants forming shrub or tree 2–8 m tall with cork-like bark and woody trunk, bearing inflated, ± smooth fruit 70–100 × 60–70 mm ..... ***Calotropis**

23b Plants smaller, without woody trunk; fruit < 60 mm long and often covered with soft bristles:

24a Robust shrubs with many erect perennial branches; rootstock consisting of fibrous roots only, spreading just below surface ..... **Gomphocarpus**

24b Few- to single-stemmed herbs with branches dying back to ground level in dry season; rootstock thickened below surface (often well below) and often forming tuber:

25a Plants consisting of a single slender, erect stem with linear to narrowly elliptic leaves:

26a Inflorescences 1–3 per plant at apex of stem ..... **Aspidonepsis**

26b Inflorescences more than 3 per stem, spread over upper half of stem ..... **Aspidoglossum**

25b Plants with several stems, stout and erect or decumbent and then erect:

27a Stems strictly erect; leaves glabrous and glaucous; inflorescence nodding.. **Gomphocarpus**

27b Stems initially horizontally spreading, then ascending; leaves scabrid and not glaucous; inflorescences erect ..... **Asclepias**

Key to genera of Marsdenieae

1a Pollinia attached directly to corpuscle (without caudicles); corona forming cylindrical tube around gynostegium; anthers with conspicuous erect and much inflated appendages filling up inside of tubular corona ..... **Fockea**

1b Pollinia with slender to stout caudicles attaching them to corpuscle; corona consisting only of small lobes behind anthers; anthers with appendages adpressed to style head:

2a Corona on staminal column absent:

3a Corona on corolla tube present as pubescent ridges with inward-directed tips ..... **Marsdenia**

3b Corona on corolla tube absent ..... **Rhyssolobium**

2b Corona on staminal tube present:

4a Erect stiff shrubs; carpels with 2 ovules ..... **Stigmatorhynchus**

4b Subshrubs or climbers, sometimes woody; carpels with few to many ovules:

5a Anther appendages small or obsolete:

6a Corolla saucer-shaped, with broadly campanulate tube, crimson or black ..... **Sphaerocodon**

6b Corolla almost flat, with obsolete tube and usually slender lobes, not crimson or black ..... **Tylophora**

5b Anther appendages elongate, membranous, incumbent on style apex or applied to side of conical tip or beak:

7a Corolla tube constricted at mouth; corona lobes broad and ± rectangular with subulate process adpressed to backs of anthers ..... **Telosma**

7b Corolla tube not constricted at mouth; corona lobes narrowing from base into process adpressed to backs of anthers ..... **Marsdenia**

Key to genera of Ceropegieae

In most recent accounts (e.g. Bruyns & Forster 1991, Liede & Albers 1994) this tribe is referred to as the Stapelieae Decne. in Candolle: 606 (1844). However, Ceropegieae Orb. (*Dictionnaire universel d'histoire naturelle* 3: 339) of 1843 predates this and is therefore the correct name for this tribe.

1a Stems herbaceous to fleshy, erect, prostrate or twining, with well-developed leaves to ± leafless and tuberculate but tubercles not arranged into angles; flowers not fleshy:

2a Corona present only as spreading, somewhat arched ridge behind anthers; style head with slender apex covered by anthers; follicles single by abortion (corolla with slender tube inflated at base) ..... **Orthanthera**

2b Corona present as two series with outer series sometimes much reduced to low ridge between anthers, then usually much taller behind inner lobes (behind anthers); style head obtuse above; follicles single or paired:

3a Roots hard, somewhat woody and fusiform (not arising from fleshy tuber); follicles single by abortion:

4a Corolla shortly campanulate to globose-campanulate (with globose to cupular tube), usually densely shaggy-pubescent on inside of lobes; inner corona lobes adpressed to anthers and rarely slightly exceeding them; pollinaria with short thick corpuscle and pollinia longer than broad; plant erect and slender with filiform leaves..... **Sisyranthus**

4b Corolla deeply lobed and ± rotate (with short bowl-shaped tube), microscopically pubescent on lobes; inner corona lobes rising up in centre and connate above style head; pollinaria with slender corpuscle (longer than broad) and pollinia broader than long; plant ± creeping with ovate- or orbicular-cordate leaves..... **Anisotoma**

3b Roots soft, often fleshy and fusiform or arising from swollen tuber; follicles paired:

5a Anthers ascending to erect, pressed into sides of style head:

6a Corolla lobes long, slender and reflexed against pedicel, guide rails minute and ± horizontal beneath edge of style head; plant erect and slender with filiform leaves..... **Macropetalum**

6b Corolla lobes and guide rails not as above; plant erect to climbing, mostly with cordate leaves:

7a Corolla tube often with inflated base, 1–3 times as long as lobes..... **Riocreuxia**

7b Corolla shallowly bowl-shaped, deeply lobed (tube < 0.5 times length of lobes) ..... **Emplectanthus**

5b Anthers horizontal and pressed into top of style head:

8a Corolla rotate to campanulate, tube broader than long, if longer, then inner corona lobes not exceeding anthers:

9a Flowering stems slender, unbranched, glabrous; leaves ± glabrous and ± reduced to midrib only, filiform and 1–2 mm broad, glabrous; exterior of corolla glabrous ..... **Tenaris**

9b Flowering stems short, usually spreading and branched, often pubescent; leaves pilose, usually with distinct blade narrowing into petiole and to apex; exterior of corolla pilose..... **Brachystelma**

8b Corolla with tube longer than maximum breadth and inner corona lobes exceeding anthers, connivent into column above style head (rarely shorter than anthers) ..... **Ceropegia**

1b Stems fleshy, with leaves reduced to minute rudiments or absent, leaf rudiments borne on tubercles arranged into 4 or more angles along stems; flowers fleshy:

10a Outer and inner series of corona lobes vertically well separated on staminal tube and not partly or wholly fused to one another (outer corona often disc-like):

11a Leaf rudiments with small stipular denticles; corona stipitate, outer series resting on rim or sides of cup formed by annulus ..... **Duvalia**

11b Leaf rudiments without stipular denticles; corona not stipitate, outer series spreading on base of tube and often partly fused to it..... **Huernia**

10b Outer and inner series of corona lobes not vertically separated on staminal tube and partly or wholly fused to one another (outer corona never disc-like):

12a Tubercles on stems arranged into 6 or more angles:

13a Each tubercle on stem armed (at least when young) with 1 or more spines (1.5–)3–15 mm long:

14a Spines 3 per tubercle; flowers deeply tubular; outer corona with long slender lobules, each tipped with a tear-like knob..... **Tavaresia**

14b Spines 1 per tubercle; flowers rotate to shallowly bowl-shaped; lobes of outer corona short, without apical knob:

15a Stem angles > 10; inner corona lobes without dorsal horn ..... **Hoodia**

15b Stem angles 6–9; inner corona lobes each with a conspicuous dorsal horn..... × **Hoodiopsis**

13b Each tubercle on stem with a small persistent leaf < 1 mm long or leafless:

16a Stems with 10 or more angles, each tubercle with small conical leaflet usually sunken into apex..... **Lavrania**

16b Stems with 6–8 angles; leaflet not distinguishable from tubercle:

17a Inflorescences each with a single flower and a single bract; outer corona forming pectinate ring around gynostegium; pollinia broader than long ..... **Pectinaria**

17b Inflorescences each with several flowers and bracts; outer corona not pectinate; pollinia longer than broad... ..... **Notechidnopsis**

12b Tubercles on stems arranged into 4 or 5 angles:

18a Stems, pedicels, sepals and outside of corolla pubescent (stems sometimes ± glabrous); leaves deciduous, erect (spreading in *S. engleriana*); flowers often covered inside with fine slender hairs..... **Stapelia**

18b Stems, pedicels, sepals and outside of corolla glabrous; leaves spreading or absent:

19a Pollinia relatively large with broad, ± cupular caudicle attached to base of pollinium; insertion crest twisted onto dorsal surface of pollinium:

20a Outer corona much reduced to absent (as spreading lobe beneath gynostegial grooves); deep nectarial cavity present behind outer corona; flowers borne near apices of stems; pollinia ± ellipsoidal ..... **Piaranthus**

20b Outer corona not much reduced; nectarial cavity shallow; flowers borne at any height on stem; pollinia ± D-shaped:

21a Surface of stem smooth (± shiny), tubercles tapering into leaf rudiments, not obtuse or leafless:

22a Leaf rudiments deltoid to subulate, usually with clearly demarkated base, caducous, with small multicellular hairs in stipular position and along margin but lacking stipular denticles; corolla usually covered with multicellular papillae ..... **Tridentea**

22b Tubercles on stem tapering to fine point and leaf rudiment without obvious base, without small hairs in stipular position but usually with stipular denticles; corolla from deeply rugulose to smooth but rarely with multicellular papillae ..... **Orbea**

23a Stems creeping; inner corona lobes pubescent..... **Orbeanthus**

23b Stems not creeping; inner corona lobes ± glabrous:

24a Inflorescences with many ± simultaneously opening flowers..... **Orbeopsis**

24b Inflorescences few-flowered:

25a Flowers > 30 mm in diameter ..... **Orbea**, **Pachycymbium lugardii** & **P. rogersii**

25b Flowers < 30 mm in diameter ..... **Pachycymbium & Orbea paradoxa**
21b Surface of stem micropapillate (dull and not shiny), tubercles obtuse and not tapering into leaf rudiments, stem ± leafless ..... **Tromotriche**
19b Pollinia small, with small ± circular attachment on ventral surface of pollinium, insertion crest exactly along outer edge of pollinium:
26a Flowers produced towards apex of stem in many small inflorescences:
27a Stems hard, tubercles tapering into hardened teeth, without differentiated leaf rudiment ..... **Quaqua**
27b Stems soft, tubercles not hardened at tip, bearing small differentiated leaf rudiments ..... **Caralluma**
26b Flowers produced towards base of stem, usually only 1 inflorescence per stem:
28a Inner corona laterally flattened, rising above anthers and connate in centre; pollinia longer than broad... ..... **Stapeliopsis**
28b Inner corona dorsiventrally flattened, adpressed to backs of anthers and not exceeding them; pollinia broader than long ..... **Ophionella**

Acokanthera G.Don 6558000

(Plumerioideae—Carisseae)

Don: 485 (1838); Stapf: 499 (1907); Codd: 245 (1963); Kupicha: 41 (1982); Kupicha: 404 (1985).

Shrubs or small trees, unarmed. **Leaves** thickly coriaceous, opposite or subopposite, simple, entire, subrotund to lanceolate or oblanceolate; axillary glands 0 or minute; stipules 0. **Inflorescence** axillary, usually much contracted, many-flowered, shortly pedunculate or sessile, corymbose or shortly racemose. **Flowers** subsessile, white or tinged with pink, scented. **Calyx** small, divided almost to base, eglandular within; lobes imbricate, ovate, acute. **Corolla** salver-shaped; tube cylindric, slightly widened at mouth, much longer than calyx, hairy within; lobes much shorter than tube, overlapping to the left. **Stamens** enclosed in widened part of tube; filaments terete; anthers 4-locular, ovate-oblong, mucronate, sometimes pilose at apex, shortly 2-lobed at base. **Disc** 0. **Ovary** entire, 2-locular, with a single, pendulous ovule in each locule; style filiform; stigma at level of anthers, conic or cylindric, with a ring of papillae at base and a minutely 2-lobed hairy tip. **Fruit** a globose to ellipsoid berry. **Seeds** 1 or 2, black or brown, elliptic, somewhat flattened. $x = 11$.

Species 5, from Yemen through E Africa to Cape region; 3 in sthn Afr., Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Adenium Roem. & Schult. 6680000

(Apocynoideae—Wrightieae)

Roemer & Schultes: xxxv, 411 (1819); Stapf: 513 (1907); Codd: 278 (1963); Plaizier: 464 (1985).

Idaneum H.Post & Kuntze: 296 (1904).

Succulent shrubs or shrublets; stems often large and swollen at base, sometimes largely subterranean, with fleshy branches. **Leaves** alternate or in spirals, often in terminal fascicles, simple, entire, sessile or shortly petioled; axillary glands conspicuous, several in each axil; stipules minute or 0. **Inflorescence** a few-flowered, subsessile, terminal cyme. **Flowers** usually showy, pink, red or purple, or sometimes partly white. **Calyx** divided almost to base; lobes lanceolate or subulate, eglandular within. **Corolla** funnel-shaped or campanulate from a short, cylindric base; lobes ± as long as tube, ovate or obovate, overlapping to the right, with paired, small or obscure scales in mouth alternating with lobes, ± confluent and forming obtriangular pockets. **Stamens** 4, inserted at base of widened part of corolla tube; filaments very short; anthers 4-locular, conniving in a cone and fused with stigma, lanceolate, with long, filiform, terminal appendages, sagittate at base, polliniferous in upper portion only, with foot of connective bearing small projection in centre and brush-like cushion below. **Disc** 0. **Ovary** of 2 free carpels; style cylindric, short; stigma capitate with basal rim and minute, bifid apiculus; ovules many, pluriseriate. **Mericarps** follicular. **Seeds** linear-oblong with a deciduous tuft of hairs at each end. $x = 11$.

Species 5, S Arabian Peninsula, Socotra, Northeast, West central Africa; 4 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Mpumalanga, Swaziland, KwaZulu-Natal, Northern and Eastern Cape.

Ancylobothrys Pierre 6562020

(Plumerioideae—Carisseae)

Pierre: 91 (1898); Kupicha: 422 (1985).

Landolphia P.Beauv.: 54, t. 34 (1806) in part.

Tendrilous lianes or low shrubs; latex present; spines 0. **Leaves** coriaceous, petiolate, elliptic, oblong or obovate-elliptic, veins closely spaced, ± straight or distantly spaced and looping towards margin; stipules 0. Cymes grouped into long terminal panicles with sensitive branches. **Calyx** lobes imbricate, united at base. **Corolla** hypocrateriform; tube usually pubescent on outer surface; lobes contorted, overlapping to the left, fringed with white hairs. **Stamens** inserted in lower half of corolla tube; filaments very short; anthers 4-locular, introrse, dorsifixed, with carina. **Ovary** hairy, uni- or bilocular; placentation axile or parietal with very prominent placentae; ovules many; style glabrous; style head cylindrical or ovoid; stigma bifid but with arms connivent. **Fruit** a many-seeded berry with densely velutinous surface; sclerified layer absent; pulp edible. **Seeds** endospermous, firmly embedded in placental pulp.

Species 10, Africa and Madagascar; 2 in sthn Afr., Botswana, Northern Province, North-West, Gauteng, Mpumalanga, KwaZulu-Natal and Northern Cape.

Anisotoma Fenzl 6868000

(Asclepiadoideae—Ceropegieae)

Fenzl: 330 (1844); Brown: 865 (1909).

Perennial herbs with woody rootstock and prostrate branches. **Leaves** petiolate, ovate- or orbicular-cordate. **Flowers** in pedunculate or sessile, umbel-like cymes. **Sepals** lanceolate, hirsute, with scales at base within. **Corolla** with shallow, basin-shaped tube; lobes longer than tube, reflexed. **Corona** arising near or at base of staminal column, 2-seriate, longer than staminal column, appearing as 5 dorsally flattened, entire or denticulate or bifid lobes opposite anthers, with a long appendage on their inner face. **Staminal column** arising from base of corolla. **Anthers** without an appendage, but with 2 or more hairs at their tips. **Pollinia** oblong or ovate, with pellucid margin in apical half, erect; caudicles short. **Follicles** narrowly fusiform, acuminate.

Species 2, sthn Afr., KwaZulu-Natal and Eastern Cape.

*Araujia Brot. 6771000

(Asclepiadoideae—Asclepiadeae)

Brotero: 62 (1817); Henderson & Anderson: 238 (1966); Forster & Bruyns: 746 (1992); Forster: 211 (1996).

Robust perennial climbers with milky sap; roots fibrous. **Leaves** petiolate, lower surface white-pubescent; colleters present. **Flowers** in axillary cymes or solitary. **Corolla** tubular below, with inflated base; lobes spreading. **Corona** corolline, of 5 discrete lobes adnate to base of staminal column and sides of corolla tube. **Anthers** 2-locular, with terminal appendage. **Pollinia** pendulous, ellipsoidal; corpuscle oblong with apical appendage; caudicles not winged. **Follicles** ovoid, spongy, up to 120 mm long. **Seeds** flattened, ovate, with micropylar tuft of hairs. $x = 10$ (1 report).

Species 5, native to South America; 1 species: **Araujia sericifera* Brot., has become widespread, especially overgrowing hedges.

Asclepias L. 6791000

(Asclepiadoideae—Asclepiadeae)

Linnaeus: 214 (1753); Brown: 663 (1907).

Perennial or annual herbs or shrubs with milky sap. **Leaves** opposite or whorled, usually sessile. **Flowers** in pedunculate or occasionally sessile umbels, lateral at nodes and terminal. **Sepals** usually with scales within base. **Corolla** rotate, tube very short, deeply 5-lobed. **Corona** of 5 lobes arising from near base of staminal column; lobes erect or radiating, laterally compressed, cucullate or compressed-cucullate or with a fissure down inner face, sometimes with 1(2) horns or other process within cavity and rarely with a dorsal lobule or reflexed horn. **Anthers** 2-locular, with terminal, membranous, incumbent or erect appendage. **Pollinia** pendulous, ellipsoidal; caudicles shorter than pollinia. **Follicles** usually solitary by abortion, globose to fusiform, smooth or with processes on surface. **Seeds** brownish, oblong, convex on back and concave on face, or flattened and narrowly winged, usually with protuberances, with tuft of hairs at micropylar end. $x = 11$ (10, 12).

Species ± 150, Africa, Arabian Peninsula, America; ± 50 in sthn Afr., widespread. Note: *Trachycalymma pulchella* is recognised as *Asclepias pulchellum*, but the remainder of the genus which occurs outside the FSA region, is retained in *Trachycalymma* (K.Schum.) Bullock.

Aspidoglossum E.Mey. 6778010

(Asclepiadoideae—Asclepiadeae)

Meyer: 200 (1838); Kupicha: 633 (1984).

Perennial herbs with annual flowering shoots; sap milky. **Stems** erect or rarely ascending, branched or unbranched, with indumentum evenly distributed or in vertical lines. **Leaves** simple, entire, usually opposite, less often verticillate or irregularly inserted; petiole short or absent; lamina usually very narrowly linear, rarely elliptic, suborbicular, hastate or obovate, hairy or glabrous; margin revolute, in narrowly linear leaves usually only midrib visible on lower surface. **Flowers** in fascicles at distal nodes of stem; bracteoles inconspicuous; pedicels pilose. **Calyx** shorter than corolla; segments triangular, dorsally pilose, ventrally glabrous, margin ciliate. **Corolla** campanulate; lobes elliptic, spreading or rarely reflexed at anthesis, very rarely (*A. connatum*) tips remaining united; dorsal surface usually pilose, less often glabrous; ventral surface pubescent or pilose, indumentum variously distributed, or glabrous, left-hand margin glabrous, right-hand margin ciliate or glabrous. **Corona**: lobes alternating with petals, each representing a dorsal outgrowth from opposing stamen, delicate or slightly chartaceous, never fleshy. **Stamens** united at base to form a hollow column from which corona lobes arise. **Anthers** 2-locular, with a membranous apical appendage resting on style head, and horny anther wings. **Pollinia** pendulous, ± sausage-shaped; germination zone, when present, represented by a limited, thinner, transparent area at point of attachment to short, slender caudicle; corpuscle linear, not flanged (except in *A. hirundo*). **Follicles** with or usually without soft appressed bristles. **Seeds** many, compressed-ovoid with dark brown rugose testa and apical tuft of hairs.

Species 34, distributed throughout southern and tropical Africa; 22 in sthn Afr., mainly along eastern side of subcontinent.

Aspidonepsis Nicholas & Goyder 6778030

(Asclepiadoideae—Asclepiadeae)

Nicholas & Goyder: 24 (1992).

Perennial geophytic herbs; rootstock a globose, fusiform or napiform tuber. **Stems** 1 (3 in *A. flava*), erect, never more than 650 mm tall. **Leaves** spreading to ascending, linear, lanceolate to narrowly elliptic, older leaves shorter and broader; petiole 0–5 mm long. **Inflorescences** umbelliform, terminal, subterminal and nodal; bracts present at anthesis. **Corolla** saucer-shaped or reflexed with lobe apices ascending. **Corona** with lower parts fused to staminal column; lobes produced 0.5–1.8 mm above corolla, cucullate; cavity saccate, with or without appendage. **Style head** swollen; apex truncated. **Anthers** 2-locular; appendages shaped like a kidney or a goat's foot, with a deep apical cleft, or rectangular; pollinaria wishbone-shaped; corpuscle fusiform, corpuscle and caudicles articulated and winged; pollinia semicircular to hemiovoid or clavate.

Species 5, confined to the high altitude mountain grasslands of the sthn Afr. Drakensberg in Mpumalanga, KwaZulu-Natal and Eastern Cape.

Astephanus R.Br. 6758000

(Asclepiadoideae—Asclepiadeae)

Brown: 43 (1810); Brown: 547 (1907).

Slender perennial twiners. **Leaves** petiolate. **Flowers** in small, subaxillary umbels. **Sepals** usually separate to near base, without scales. **Corolla** 5-lobed, with campanulate tube, longer than sepals, sometimes angled, with 5 patches of hair within. **Corona** 0. **Staminal column** arising from near base of corolla. **Anthers** 2-locular, with short, ovate, erect, membranous appendages, not or only shortly spurred at base. **Pollinia** oblong; caudicles very short. **Follicles** solitary by abortion, terete-fusiform, acuminate. **Seeds** crowned with a tuft of hairs.

Species ± 30, Africa and America; 2 in sthn Afr., Western and Eastern Cape.

Baissea A.DC. 6663000

(Apocynoideae—Apocyneae)

Candolle: 424 (1844); Codd: 276 (1963); De Kruif: 495 (1985); Van Dilst: 89 (1995).

Zygodia Benth.: 716 (1879). *Perinerion* Baill.: 758 (1888). *Guerkea* K.Schum.: 180, fig. 59 (1895). *Conodura* K.Schum.: 229 (1896).

Woody climbers, often very tall. **Leaves** opposite, simple, entire, shortly petioled, penninerved, often acuminate; axillary glands 0; stipules 0. **Inflorescence** terminal or axillary, paniculate or corymbose, rarely a few-flowered cyme. **Flowers** relatively small, white or purple, usually fragrant. **Calyx** small, divided almost to base, eglandular or with 5 glands; lobes imbricate, lanceolate, ovate-lanceolate, or rotundate. **Corolla** funnel-shaped or campanulate, usually widest or slightly constricted at mouth, glabrous within, usually with

fleshy, projecting calli or scales just above insertion of stamens; lobes longer than tube, mostly very narrow, overlapping to the right. **Stamens** inserted above base of corolla tube; filaments very short, stout; anthers 4-locular, conniving in a cone around style, lanceolate, apiculate, long-sagittate at base, polliniferous in upper part only, with foot of connective hollowed out. **Disc** saucer-shaped or cupular, subtruncate, sinuate or 5-lobed. **Ovary** of 2 free carpels, slightly inferior, subtruncate, usually pubescent; style shorter than stamens; stigma ellipsoid with 5 pits and small, 2-lobed apex. **Mericarps** 2, follicular, usually cylindric and slender. **Seeds** linear-lanceolate to oblong, truncate at tip with a deciduous, apical tuft of hairs. $x = 11$.

Species 18, continental Africa, Angola, Zambia; 1 in sthn Afr.: *Baissea wulfhorstii* Schinz, N Namibia, N Botswana.

Brachystelma R.Br. 6870000

(Asclepiadoideae—Ceropegieae)
Brown: t. 2343 (1822); Brown: 833 (1908); Phillips: 607 (1951); Dyer: 1 (1980); Dyer: 12 (1983).

Dichaelia Harv.: 241 (1868); Bullock: 358 (1953b); Huber: 28 (1967c). *Brachystelmaria* Schltr.: 50 (1895). *Aulostephanus* Schltr.: 451 (1896). *Blepharanthera* Schltr.: 146 (1913). *Kinepetalum* Schltr.: 149 (1913). *Siphonostelma* Schltr.: 148 (1913); Huber: 52 (1967c).

Perennial herbs, usually dwarf, with a single tuber or a cluster of fusiform roots; with 1–few annual stems, prostrate to erect, rarely twining. **Leaves** sessile or petiolate. **Flowers** in a terminal umbel or umbel-like cyme or 1–several together, lateral at nodes, pedicellate, rarely shortly pedunculate. **Sepals** often with scales within base. **Corolla** campanulate to flattish, sometimes ± tubular; lobes longer or shorter than united base, variously spreading, or united at tips and forming a cage-like structure. **Corona** arising from staminal column, 2-seriate or sometimes appearing 1-seriate, longer or shorter than staminal column; outer corona of distinct lobes bifid or divided almost to base, or cup- or saucer-shaped, forming pockets between base of inner lobes, with 5 or 10 teeth or lobules, occasionally reduced to cushion-like thickenings; inner corona lobes opposite anthers, usually linear-oblong, erect or incumbent, rarely clavate. **Anthers** 2-locular, incumbent or inflexed on staminal column or suberect, oblong or subquadrate, without apical appendage. **Pollinia** subglobose, oblong or suborbicular, sometimes compressed, erect or horizontal, sometimes largely exposed in each anther theca; caudicles short; corpuscle hard, often winged. **Follicles** fusiform, smooth, green, sometimes mottled. **Seeds** oblong, convex on one side, flat or concave on other, with narrow, marginal wing, crowned with tuft of hairs. $x = 11$.

Species over 100, Africa, India to Australia; ± 80 in sthn Afr., widespread, but rarely common.

Callichilia Stapf 6607000

(Plumerioideae—Tabernaemontaneae)
Stapf: 130 (1902); Beentje: 1 (1978); Beentje: 449 (1985).

Ephippiocarpa Markgraf: 309 (1923); Codd: 272 (1963). *Hedranthera* (Stapf) Pichon: 225 (1948).

Shrubs, glabrous, with white latex; branches unarmed, lenticellate; trunk dichotomously branched. **Leaves** decussate, those of a pair equal or unequal, subsessile or petiolate; petiole with colleters at base; stipules intrapetiolar. **Inflorescences** 1 or 2 in forks of branches, pendulous, pedunculate, congested, cymose; bracts with colleters. **Flowers** often fragrant. **Sepals** connate at extreme base only, imbricate, much shorter than corolla, inside with 1–4 rows of minute glands near base. **Corolla** tube carnose, glabrous except for pilose ridges leading downward from base of filaments inside; tube cylindrical in lower part, wider in upper part and there cylindrical or infundibuliform; lobes membranous, obtriangular, oblique, with 2 apices, 1 acute, 1 rounded. **Stamens** included, connivent in a cone; filaments shorter than anthers; anthers 4-locular, glabrous, auriculate at base, 2-celled. **Ovary** glabrous; carpels connate at very base only; disc present; style slender, style head 5-winged; stigma small. **Fruit** berry-like, semisyncarpous, several-seeded, thin-walled. **Seeds** ovoid, testa longitudinally striate and rough, brown; endosperm copious, surrounding straight embryo. $x = 11$.

Species 7, Africa; 1 in sthn Afr.: *Callichilia orientalis* S.Moore, N KwaZulu-Natal.

*Calotropis R.Br. 6792000

(Asclepiadoideae—Asclepiadeae)
Brown: 28 (1810); Rahman & Wilcock: 301 (1991).

Large erect shrubs or small trees. **Stems** slightly woody, much branched at base, with cottony tomentum when young. **Leaves** thick, fleshy, broad, with cottony tomentum on lower surfaces, nearly sessile, oblong-obovate to broadly obovate, apex apiculate, base narrowly cordate. **Inflorescence** cymes, lateral, umbellate, mostly solitary at nodes. **Calyx**: lobes ovate-lanceolate, glandular within. **Corolla** broadly campanulate, pink above and white at base; lobes ovate-lanceolate, erect. **Corona** of broad scales, laterally compressed with a dorsal spur, adnate to and equalling or longer than staminal column, apex bifid; basal spur acute, incurved. **Anthers** with thin white membranous tips. **Pollinia** pendulous in each anther theca; corpuscle dark brown, rod-shaped, 2-celled. **Style head** 4 mm long, pentagonal. **Follicles** inflated, subglobose to obliquely ovoid. **Seeds** ovate, with a tuft of silky hairs.

Species 3, distributed in tropical and subtropical Africa and Asia, and introduced into Central and South America; 1 naturalised in sthn Afr.: **Calotropis procera* (Aiton) R.Br.

Caralluma R.Br. 6884000

(Asclepiadoideae—Ceropegieae)
Brown: 14 (1810); Brown: 872 (1909); White & Sloane: 151 (1937a); Gilbert: 10 (1990).

Austrolluma Plowes: 54 (1995).

Dwarf, glabrous succulent forming small clumps. **Stems** ± 4-angled, fleshy, erect, from horizontal underground runners, silvery grey-green mottled with purple; tubercles rectangular in outline, tipped by rudimentary leaf, occasionally developing brownish callus. **Inflorescences** 3–10 per stem arising in upper half of stem, each with 1 or 2 flowers on short pedicels, ± without peduncle. **Sepals** ± ovate-lanceolate, often with scales within base. **Corolla** rotate, outside pale green, inside with white hairs; lobes, ± triangular, sometimes elongate, without marginal cilia. **Corona** 2-seriate, sometimes appearing 1-seriate; outer corona often united into a cup-shaped tube or forming pockets between inner lobes and margin variably divided into 5–20 teeth; inner corona lobes 5, subulate to oblong to club-shaped, sometimes much overtopping staminal column. **Anthers** 2-locular, horizontal on top of style head. **Pollinia** horizontal or ascending, with amber inner margin, usually compressed, with short caudicles and winged corpuscle. **Follicles** fusiform. **Seeds** ± oblong, convex on one side, concave on other, with apical tuft of hairs. $x = 11$ (aneuploids, polyploidy).

Species 1, in sthn Afr.: *Caralluma peschii* Nel, Namibia.

Carissa L. 6559000

(Plumerioideae—Carisseae)

Linnaeus: 189 (1767a); Linnaeus: 7, 52 (1767b) name conserved; Stapf: 496 (1907); Codd: 250 (1963); Kupicha: 398 (1985).

Shrubs or small trees, much branched, spiny, sometimes scandent; spines opposite, simple or forked, often very stout. **Leaves** leathery, opposite, simple, entire, broadly ovate to ovate-lanceolate, petiolate; axillary stipules 0; axillary glands very small or 0. **Inflorescence** terminal or pseudo-axillary, usually much contracted, umbellate or corymbose, rarely a cyme. **Flowers** subsessile, often conspicuous, white or tinged with pink, scented. **Calyx** small, divided almost to base, eglandular within or rarely multiglandular; sepals (4)5, imbricate, ovate, acute. **Corolla** salver-shaped; tube cylindric, slightly wider below mouth or near middle, hairy within, sometimes densely hairy in throat; lobes longer or shorter than tube, overlapping to the right or to the left. **Stamens** enclosed in widened part of corolla tube; filaments short, slender; anthers 4-locular, linear-oblong, sometimes apiculate. **Disc** 0. **Ovary** entire, 2-locular, with 1–4, rarely many, ovules in each locule, with a 2-lobed, hairy tip. **Fruit** a globose to oblong berry. **Seeds** usually 1–4 rarely more, flat, irregularly shaped; testa rough or smooth. $x = 11$ (polyploidy).

Species ± 20, tropics and subtropics of Africa, Madagascar, the Mascarenes, Asia and Australia, 7 in Africa; 5 in sthn Afr., in all countries and provinces.

*Catharanthus G.Don 6597000

(Plumerioideae—Plumerieae)

Don: 95 (1837); Codd: 267 (1963); Plaizier: 453 (1985).

Vinca L.: 209 (1753) in part; *Lochnera* Rchb. ex Endl.: 583 (1838).

Perennial, rarely annual herbs or subshrubs. **Leaves** opposite, simple, entire, shortly petioled, penninerved; axillary glands many in a fringe; stipules 0. **Flowers** axillary, solitary or paired, fairly large, white or pink. **Calyx** small to medium-sized, divided almost to base; lobes 5, subulate. **Corolla** salver-shaped; tube slender, cylindric, slightly widened near mouth; mouth constricted, velvety within, without appendages; lobes large, overlapping to the left. **Stamens** in widened part of tube; filaments very short; anthers 4-locular, free from stigma, ovate-lanceolate, acute, shortly and obtusely 2-lobed at base. **Disc** replaced by two long, linear glands; glands alternating with carpels. **Ovary** of 2 free carpels; style filiform; stigma depressed-capitate with a long, hyaline, reflexed frill at base and a minute, obtuse, 2-lobed apiculus surrounded by a very short, erect, membranous rim; ovules many, 2-seriate. **Mericarps** 2, follicular, cylindric, slightly spreading. **Seeds** small; testa rugose; hilum lateral. $x = 8$.

Species 8, 1 in India and Sri Lanka, the others confined to Madagascar; a Madagascan species, **Catharanthus roseus* (L.) G.Don, is a widespread, sometimes cultivated, weed of waste places in warm, dry areas, especially in eastern sthn Afr.

Ceropegia L. 6874000

(Asclepiadoideae—Ceropegieae)

Linnaeus: 211 (1753); Brown: 804 (1908); Huber: 5 (1957); Huber: 114 (1967); Bruyns: 21 (1980); Dyer: 43 (1980); Dyer: 133 (1983).

Perennial herbs, with a tuber, or clusters of fusiform, or occasionally fibrous roots. **Stems** prostrate to erect, often twining, sometimes succulent. **Leaves** sessile or petiolate, sometimes fleshy, occasionally rudimentary on fleshy stems. **Flowers** in umbel-like clusters, racemes, or 1–several developing together or in succession, mainly lateral on nodes. **Corolla** with tube usually longer than lobes, often ± inflated near base, narrowed above, then expanding to mouth, often with long hairs within; lobes recurved, pendulous, connate at tips into a cage-like structure, forming umbrella-like canopy, or a capitate and winged apical body; free margins often replicate, often ciliate. **Corona** 2-seriate; outer corona cupular, campanulate, 5-notched, 5- or 10-toothed, of 5 bifid lobes, or reduced to pockets between bases of inner lobes and confluent with them; inner corona lobes linear, linear-lanceolate, spatulate or filiform, sometimes with dilated tips, usually longer than staminal column and incumbent upon it. **Anthers** 2-locular, without appendages. **Pollinia** ascending or subhorizontal; caudicles short; corpuscle usually winged. **Follicles** narrowly fusiform, acute or obtuse, smooth or rugose. **Seeds** obovate, narrowly winged, crowned with a tuft of hairs. $x = 11$ (aneuploids, polyploidy).

Species over 160, Africa and Madagascar to Australia; more than 50 in sthn Afr., widespread, but rarely common; rare in Western Cape.

Cordylogyne E.Mey. 6783000

(Asclepiadoideae—Asclepiadeae)

Meyer: 218 (1838); Brown: 585 (1907).

Perennial herbs, erect, with thickened rootstock. **Leaves** sessile, slender. **Flowers** in terminal, peduncled, dense umbels, 1 or 2(3 or 4) to a stem. **Sepals** with scales within base. **Corolla** 5-lobed almost to base, yellow to brown; lobes oblong. **Corona** of 5 lobes arising from base of staminal column; lobes erect, spatulate-hastate or oblong-linear, with a minute tooth about middle of each side and with 2 keels and a transverse ridge or flap on inner face, without other processes at base. **Staminal column** arising from base of corolla, cylindric. **Anthers** 2-locular, with erect, deeply concave, membranous appendages. **Pollinia** pendulous, oblong-linear, attached by slender caudicles to a minute corpuscle. **Style head** produced above anther appendages into a club-shaped structure. **Follicles** narrowly fusiform. **Seeds** brown, flattened, ovate, with a narrow, marginal wing.

Species 1: *Cordylogyne globosa* E.Mey., widespread in sthn Afr., mainly eastern parts in damp or marshy places of high grasslands.

Cryptolepis R.Br. 6740000

(Periplocoideae—Cryptolepideae)

Brown: 58 (1811); Brown: 242 (1904); Brown: 526 (1907).

Curroria Planch. ex Benth.: 457 (1849). *Ectadiopsis* Benth.: 741 (1876).

Large to slender climbers or woody shrubs; roots not tuberous. **Leaves** linear to ovate or orbicular, opposite or subfascicled on short shoots, herbaceous to coriaceous, small to large, petiolate to sessile. **Inflorescences** terminal and/or axillary, racemose, few- to many-flowered. **Flowers** with gynostegium enclosed in corolla tube. **Sepals** ovate to triangular. **Corolla**: tube campanulate, lobes longer than tube, oblong-ovate to narrowly ovate; secondary corona of corniculate or filiform processes sometimes arising from corolla sinus pockets. **Corona** arising at ± middle of corolla tube; lobes clavate and fleshy or filiform. **Stamens** arising from near base of corolla tube; filaments free, short; anthers 4-locular, deltoid to hastate. **Style head** conical. **Follicles** paired, widely to narrowly divergent, linear-terete to very narrowly ovoid. **Seeds** oblong to obliquely ovate, smooth or warty, with tuft of hairs.

Species ± 25, Africa, Madagascar and Asia, from semidesert to savanna and tropical rain forest; 6 in sthn Afr., Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Northern Cape.

Cynanchum L. 6834000

(Asclepiadoideae—Asclepiadeae)

Linnaeus: 212 (1753); Brown: 743 (1908); Liede: 503 (1993).

Perennials, usually twining, sometimes erect or decumbent. **Leaves** usually petiolate. **Flowers** small, never exceeding 10 mm in diameter, fasciculate, or in simple or compound, pedunculate cymes, rarely in racemes, subaxillary or lateral at nodes. **Sepals** often with scales within base. **Corolla** deeply 5-lobed, white or cream. **Corona** arising from or near base of staminal column, annular, cup-shaped or tubular, truncate, toothed or lobed or divided nearly to base into 5 entire or toothed lobes, sometimes with a tooth, lobule, thickening or keels near base of inner surface. **Anthers** 2-locular, with obovate-oblong, lanceolate or linear, membranous, inflexed or erect appendage, with membranous margin. **Pollinia** pendulous, ellipsoid, ovate or oblong; caudicles shorter than pollinia. **Follicles** usually solitary, sometimes winged or keeled, smooth. **Seeds** compressed, elliptic and narrowly winged or convex on one side and flat on other, with protuberances. $x = 11$ (aneuploids, polyploidy).

Species ± 100, cosmopolitan; 12 in sthn Afr., widespread.

Diplorhynchus Welw. ex Ficalho & Hiern

(Plumerioideae—Plumerieae) 6589000

Ficalho & Hiern: 22 (1881); Codd: 264 (1963); Plaizier: 451 (1985).

Shrubs or small trees. **Leaves** opposite, simple, entire, petioled; axillary glands obscure or 0; stipules 0. **Inflorescence** a terminal, often lax, panicle. **Flowers** fairly small, fragrant. **Calyx** small, eglandular within; sepals 5, almost free, ovate, pubescent. **Corolla** salver-shaped; tube much longer than calyx, cylindric to subcampanulate, without appendages, slightly widened above middle and constricted at mouth, glabrous within; lobes oblong to linear-oblong, overlapping to the left. **Stamens** 5, included, inserted in widened part of tube; filaments short; anthers 4-locular, ovate, acute, longer than filaments, bilobed at base. **Disc** 0. **Ovary** of 2 free carpels; style shorter than corolla tube, terete; stigma at level of anthers, thickened, with bifid apiculus; ovules 2–4 in each carpel. **Mericarps** 2, follicular, woody, spreading, oblong, compressed, sometimes slightly curved, apiculate, lenticellate, dehiscent. **Seeds** compressed, winged. $x = 11$ (1 report).

Species 1: *Diplorhynchus condylocarpon* (Müll.Arg.) Pichon; tropical and sthn Afr., in Namibia, Botswana, Northern Province, North-West, Gauteng and Mpumalanga.

Duvalia Haw. 6883000

(Asclepiadoideae—Ceropegieae)

Haworth: 44 (1812); Brown: 1024 (1909); White & Sloane: 741 (1937b); Leach: 45 (1969); Dyer: 363 (1971); Leach: 21 (1974a); Meve: 194 (1988); Meve: 1 (1997).

Dwarf, succulent, leafless perennials, decumbent to erect; occasionally rhizomatous. **Stems** 4–6-angled, glabrous, fleshy; angles tubercled with rudimentary leaves from centre of tubercle and minute glandular stipules on each side of base of rudimentary leaves. **Flowers** on rudimentary peduncles; 1 or more opening together or in succession, mainly in lower half of stem. **Sepals** ovate-lanceolate, acuminate, sometimes with scales within base. **Corolla** raised into a cushion-like, fleshy, circular to pentagonal annulus in centre, lobes spreading, ± lanceolate, usually with strongly replicate margins, sometimes ciliate with fixed or vibratile hairs. **Corona** 2-seriate, arising from near top of staminal column; outer corona hidden by or sometimes hiding annulus, flat and disc-like, or occasionally slightly 5(or 10)-angled, with or without hairs or papillae; inner corona of 5 ± turgid lobes, with swollen bases and inner face somewhat incumbent on anthers and rising symmetrically around centre of staminal column. **Anthers** 2-locular, ± horizontal on top of style head, without apical appendage. **Pollinia** ± ellipsoid with pellucid inner margin. **Follicles** erect, terete-fusiform, glabrous, smooth. **Seeds** with apical tuft of hairs. $x = 11$ (aneuploids, polyploidy).

Species 17, Africa; 13 in sthn Afr., widespread in drier areas.

Ectadium E.Mey. 6735000

(Periplocoideae—Cryptolepideae)

Meyer: 188 (1838); Harvey: 230 (1838); Brown: 531 (1907); Huber 113: 3 (1967b); Venter *et al.*: 113 (1990).

Erect to decumbent shrubs; roots simple. **Leaves** shortly petiolate; lamina linear-ovate to narrowly ovate to obovate, elliptic or orbicular, coriaceous with hairy stomatal crypts and grooves, puberulous to tomentose, becoming glabrous with age, base rounded to cuneate, apex acuminate to acute and mucronate. **Inflorescences** few- to many-flowered, axillary. **Flowers** with gynostegium enclosed in corolla tube. **Sepals** ovate to narrowly ovate, puberulous to tomentose. **Corolla** pale green to yellow, trumpet-shaped; tube cylindrical; lobes oblong, apex obtuse to obliquely obtuse. **Corona** arising in corolla mouth, lobes subulate with bases dilated, fused laterally to bases of corolla lobes forming sinus-pouches. **Stamens** arising near base of corolla tube; filaments free; anthers 4-locular, hastate with subulate, hairy upper parts. **Style head** broadly angularly ovoid, apex acute and bifid. **Follicles** paired, horizontally opposite, narrowly to very narrowly ovoid. **Seeds** narrowly subovoid, with tuft of silvery-white hairs.

Species 3, Namib Desert of Namibia; very arid, windswept coastal plains with night fog.

Emplectanthus N.E.Br. 6899010

(Asclepiadoideae—Ceropegieae)

Brown: 771 (1908); Meve 124 (1998).

Delicate, leafy, herbaceous twiners; stems slender, unifariously pubescent. **Leaves** petiolate, cordate, acuminate, membraneous. **Inflorescence** lateral at nodes, in lax, peduncled cymes. **Corolla** deeply 5-lobed; united part forming a broad shallow cupular tube; lobes valvate in bud. **Corona** double, arising from staminal column; outer corona 5-lobed, lobes small, pouch-like, spreading; inner corona of 5 simple lobes, erect to suberect, ± adnate to stamens, with free tips overtopping stylar head; dorsally connected with base of outer corona lobes. **Anthers** 2-locular, erect or incurved-ascending, adnate to sides of or subincumbent upon truncate style apex, without apical appendage; pollinia erect, minute, ovoid to subquadrate with a pellucid margin on inner side; caudicles very short. **Follicles** only 1 per flower, long and slender-fusiform, terete.

Species 2, KwaZulu-Natal.

Eustegia R.Br. 6785000

(Asclepiadoideae—Asclepiadeae)

Brown: 40 (1810); Brown: 759 (1908); Bruyns: 36 (1999a).

Perennial herbs, with tuberous rootstock and with many short, decumbent or ascending branches. **Leaves** small, narrow, sessile or subsessile. **Flowers** in peduncled umbels, lateral at nodes. **Sepals** sometimes with scales within base. **Corolla** deeply 5-lobed, green; lobes oblong-lanceolate. **Corona** arising from base of staminal column, consisting of 3 series of erect, membranous

lobes, ± as long as column; outer series of 5 lobes opposite corolla lobes, oblong or linear and broadened at base, entire or bifid; middle series subsimple, linear or deeply divided into linear segments alternating with corolla lobes; inner series of 5 linear, entire lobes alternating with corolla lobes. **Anthers** 2-locular, with ovate, membranous appendages. **Pollinia** pendulous, ovate-oblong; caudicles as long as pollinia; corpuscle shortly winged. **Follicles** usually solitary by abortion, ± fusiform, smooth.

Species 1, sthn Afr., Northern and Western Cape.

Fanninia Harv. 6779000

(Asclepiadoideae—Asclepiadeae)
Harvey: 235 (1868); Brown: 662 (1907).

Perennial herbs with tuberous rootstock. **Leaves** shortly petiolate or subsessile, lanceolate, ellliptic, or oblong, pubescent. **Flowers** in a few-flowered, terminal umbel, white with purple corona lobes. **Sepals** with scales in sinuses, pilose. **Corolla** lobed nearly to base; lobes oblong-elliptic, pilose, showy. **Corona** arising from staminal column, appearing stipitate, of 5 conspicuous lobes, three-quarters the length of corolla lobes, linear-oblong, slightly emarginate at apex, with distinct midrib and 2 erect, acute lobules from near base. **Anthers** 2-locular, united to style with fringed, membranous appendages. **Pollinia** pendulous. **Follicles** not known.

Species 1: *Fanninia caloglossa* Harv., KwaZulu-Natal to Eastern Cape near East London.

Fockea Endl. 6924000

(Asclepiadoideae—Marsdenieae)
Endlicher: 17 (1839); Brown: 777 (1908).

Perennial herbs, erect or twining, with tuberous, sometimes very large and partially exposed rootstock. **Leaves** sessile or shortly petiolate, linear or elliptic, sometimes undulate. **Flowers** in small, axillary clusters or cymes. **Sepals** shorter than corolla tube. **Corolla** with campanulate tube; lobes longer than tube, lanceolate to filiform. **Corona** complex, arising near mouth or towards base of corolla tube together with staminal column, longer than staminal column, tubular, toothed at top and with 1–3 superposed series of 5 teeth or filiform processes placed between or decurrent as 5 pairs of wings within tube. **Staminal column** arising near mouth or towards base of corolla tube. **Anthers** 2-locular, with very large, membranous appendages. **Pollinia** erect; caudicles short. **Style** minutely 2-lobed. **Follicles** fusiform, usually acuminate. **Seeds** obovate or elliptic, flattish, with a marginal wing.

Species 6, tropical and sthn Afr.; 6 in sthn Afr., widespread in arid regions.

Gomphocarpus R.Br. 6787000

(Asclepiadoideae—Asclepiadeae)
Brown: 26 (1810); Bullock: 405 (1952).

Perennial herbs or shrublets 0.5–2(–5) m tall, with fibrous rootstock. **Stems** bifarious, hollow. **Leaves** paired (ternate in *G. rivularis*); colleters 0 (except in *G. rivularis*). **Inflorescence** umbelliform (shortly cymose in *G. rivularis*). **Corolla** white to pale greenish yellow. **Corona** lobes saccate; with or without appendages. **Anthers** 2-locular, with terminal, membranous, incumbent or erect appendage. **Pollinia** pendulous; caudicles shorter than pollinia. **Follicles** beaked, echinate and inflated; occasionally smooth and not inflated.

Species 25–32, Africa and Asia; 10 in sthn Afr., widespread.

Gonioma E.Mey. 6581000

(Plumerioideae—Plumerieae)
Meyer 188 (1838); Stapf: 503 (1907); Codd: 262 (1963).

Shrubs or small trees. **Leaves** opposite or 3- or 4-nate; axillary glands few, minute; stipules 0. **Inflorescence** a terminal corymb. **Flowers** small, fragrant. **Calyx** small, eglandular within; sepals 5, free, ovate-elliptic, imbricate. **Corolla** salver-shaped; tube cylindric, much longer than calyx, scarcely widened above middle, without appendages, pilose within; lobes shorter than tube, overlapping to the left. **Stamens** 5, included, inserted ± middle of corolla tube; filaments short, filiform; anthers 4-locular, longer than filaments, lanceolate, acute. **Disc** 0. **Ovary** of 2 free carpels; style shorter than corolla tube, terete; stigma at level of anthers, somewhat thickened, ovate, 2-lobed at apiculate apex; ovules many in each locule, multiseriate. **Mericarps** 2, follicular, coriaceous, oblong or linear-oblong, apiculate, subterete, straight or slightly curved. **Seeds** flat, broadly cuneate or subrectangular, winged at each end.

Species 1, *Gonioma kamassi* E.Mey., in Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Holarrhena R.Br. 6582000

(Apocynoideae—Wrightieae)
Brown: 51 (1810); Codd: 263 (1963); De Kruif: 456 (1985).

Shrubs or trees. **Leaves** opposite or subopposite, membranous, shortly petioled or subsessile, glandular towards base of petiole; stipules 0. **Inflorescence** a terminal or pseudo-axillary corymb, many-flowered. **Flowers** white, fragrant. **Calyx** small, eglandular within or with 2–5 glands alternating with sepals; sepals 5, ovate-lanceolate to subulate. **Corolla** salver-shaped; tube slender, subcylindric, slightly widened below middle, throat contracted; lobes overlapping to the right. **Stamens** 5, inserted near base of corolla tube; anthers 4-locular, included, oblong-lanceolate to linear, mucronate, rounded at base; filaments short, filiform. **Disc** 0. **Ovary** of 2 free carpels; style very short, filiform; stigma ellipsoid to fusiform, apex entire or 2-toothed, viscous. **Mericarps** 2, follicular, divaricate, slender, terete, often falcate. **Seeds** many, subterete, grooved on flat (ventral) side, with tuft of hairs at apex; cotyledons broad, complicate; radicle short; endosperm scanty. $x = 11$.

Species 4, Asia and Africa, 2 in Africa; 1 in sthn Afr.: *Holarrhena pubescens* (Buch.-Ham.) Wall. ex G.Don, in Northern Province, Mpumalanga and KwaZulu-Natal.

Hoodia Sweet ex Decne. 6878000

(Asclepiadoideae—Ceropegieae)
Decaisne: 644 (1844); Brown: 896 (1909); White & Sloane: 1050 (1937c); Bullock: 508 (1957); Bruyns: 182 (1993).

Trichocaulon N.E.Br.: 164 (1878) in part; Brown: 888 (1909); White & Sloane: 991 (1937c).

Spiny succulents, small to large, with few to many stems, branching mainly from base. **Stems** cylindric, erect (rarely prostrate), glabrous, 25–60(–110) mm thick, covered with obtuse tubercles vertically arranged into 11–31 rows, each tubercle tipped with a weak to hard, sharp spine 3–12 mm long. **Flowers** 1 to many in groups, opening successively (rarely simultaneously), near apex of stem. **Calyx** lobes overlapping slightly at broad bases, glabrous. **Corolla** 8–170 mm diam., small and deeply lobed to large, flat and saucer- to shallowly cup-shaped, lobes valvate in bud, glabrous outside and inside, papillate to smooth within, each papilla ending in a hair. **Corona** 2-seriate, arising from staminal column, mostly glabrous; outer corona at least basally cupular,

emarginate or bifid towards apex; inner corona of 5 dorsiventrally flattened lobes incumbent on backs of anthers, dorsally connected to outer lobes. **Staminal column** arising near base of corolla tube. **Anthers** 2-locular, incumbent on top of style head, subquadrate, without apical appendage; style head not produced beyond anthers, truncate-depressed at apex. **Pollinia** ± horizontal, with short caudicles. **Follicles** teretefusiform, slender, paired, with horns somewhat diverging, uniformly coloured, glabrous, smooth. $x = 11$.

Species 13, Africa; 12 in sthn Afr., Namibia, Botswana, Northern Province and western half of South Africa (west of 25°E).

× Hoodiopsis C.A.Lückh. 6878010

(Asclepiadoideae—Ceropegieae)
Lückhoff: 231 (1933); White & Sloane: 1091 (1937c).

Leafless, tufted succulents. **Stems** 7–9-angled, with angles tuberculate; tubercles tipped with rudimentary leaves. **Flowers** several from rudimentary peduncles arising from above middle of stems, produced successively, or sometimes 2 open together. **Corolla** star-shaped, with small, central tube surrounding corona; lobes with slightly recurved margins. **Corona** arising from staminal column; outer corona of 5 spreading lobes grooved down face; inner corona lobes horned. **Staminal column** arising from base of corolla tube. **Anthers** 2-locular, incumbent on column. **Pollinia** ± erect, with short caudicles. **Follicles** not known.

Species 1, sthn Afr.: × *Hoodiopsis triebneri* C.A.Lückh., Namibia; thought to be a natural hybrid between *Hoodia* and *Orbeopsis*.

Huernia R.Br. 6887000

(Asclepiadoideae—Ceropegieae)
Brown: 11 (1810); Brown: 902 (1909); White & Sloane: 819 (1937c); Leach: 1 (1988).

Succulent, dwarf, perennial herbs, caespitose or creeping, rarely prostrate or pendent. **Stems** glabrous, mostly 4- or 5(6)-angled and prominently toothed along angles, rarely subcylindric. **Leaves** modified to form acute tips to tubercle teeth, without stipules, sometimes persisting and becoming hardened, acute points, rarely rudimentary, in a few species forming soft bristles at apex of teeth. **Inflorescence** glabrous, usually 1 per stem, a successively flowering, shortly pedunculate cyme in lower half of stem, rarely single-flowered; peduncle short, stout. **Corolla** tubular, campanulate, bicampanulate or subrotate, with or without an annulus; corolla 5-lobed with 5 intermediate lobes in sinuses, seldom exceeding 50 mm in diameter; outside smooth or sometimes scabrellous, rarely minutely asperate, glabrous; inside mostly papillate or tuberculate, rarely smooth, often provided with simple bristles or setae, clavate and/or much inflated hairs; lobes spreading to reflexed, flat or concave, sometimes canaliculate towards apex, very slightly convex but never replicate, margins without cilia. **Corona** 10-lobed in 2 alternating series, sessile outer lobes partially adnate to base of tube, velvety textured, united to form a flattish or somewhat conical, or convex disc merging into staminal column; inner lobes arising at top of staminal column, smooth-textured, simple, incumbent on anthers, ovate, triangular-oblong, obtuse or subacute, subulate, or variably clavate, apical portion often minutely tuberculate, usually with a transverse ridge or gibbosity at their base, and sometimes shortly decurrent below, the gibbosity is much enlarged and sometimes erect. **Staminal column** erect, anther wings erect, diverging at base, forming a 'gape' with ± triangular nectarial orifice behind and a small fleshy tubercle in front. **Anthers** 2-locular, horizontal on top of style head. **Pollinia** compressed oblong-ellipsoid; caudicles short; corpuscle relatively short and broad, attached to edge of pentagonal style head by short lateral wings. **Follicles** erect, fusiform, glabrous. **Seeds** ± ovate, much compressed, almost flat, with a tuft of hairs. $x = 11$ (polyploidy).

Species 64, Africa and S Arabian Peninsula; 39 in sthn Afr., widespread in drier areas.

Kanahia R.Br. 6780000

(Asclepiadoideae—Asclepiadeae)
Brown: 28 (1810); Brown: 295 (1902); Field *et al.*: 787 (1986).

Perennial herbs with woody rootstock, branched from base, rarely above. **Leaves** subsessile, slender, with minute colleters in leaf axils. **Flowers** in pseudoumbels lateral at nodes, with peduncles racemosely scattered along upper part of branches. **Sepals** with row of scales within base. **Corolla** lobed to halfway or more, greenish; lobes spreading or erect, slightly overlapping to left in bud, with upper surface bordered with woolly hairs and pubescent within. **Corona** of 5 lobes, arising from staminal column; lobes ± complicate or fissured on inner surface, and projected into 2 short horns directed over staminal column. **Staminal column** arising from base of corolla. **Anthers** 2-locular, with membranous appendages deflexed on column, bluntly spurred at base. **Pollinia** terete, attached horizontally to corpuscle by caudicles. **Follicles** ± ellipsoid, rounded and smooth on outer side, grooved on inner side. **Seeds** convex on one side, concave on other, tapering to apex, with tuft of hairs.

Species 4, Africa and Arabian Peninsula; 1 in sthn Afr.: *Kanahia laniflora* (Forssk.) R.Br., Northern Province, in rocky watercourses.

Landolphia P.Beauv. 6562000

(Plumerioideae—Carisseae)
Beauvois: 54, t. 34 (1806) name conserved; Stapf: 492 (1907); Codd: 258 (1963); Kupicha: 408 (1985).

Shrubs or woody climbers, climbing by sensitive inflorescences or tendrils (modified inflorescences), rarely dwarf shrubs or undershrubs, glabrous or hairy; sap milky. **Leaves** leathery, opposite, shortly petioled, penninerved; axillary glands minute, obscure, or subulate to filiform; stipules 0. **Inflorescence** terminal, many-flowered, corymbose or paniculate. **Flowers** small to medium-sized, sessile or pedicelled, white or often tinged with red or purple, scented. **Calyx** small, leathery, eglandular, divided almost to base. **Corolla** salver-shaped; tube ± narrowly cylindric, widened and staminiferous near base or sometimes near or above middle; mouth somewhat constricted, glabrous; lobes overlapping to the left, usually longer than tube. **Stamens** 5; filaments short; anthers 4-locular, ovate to lanceolate, dehiscing to minutely 2-lobed base. **Disc** 0. **Ovary** entire, 1-locular, glabrous or hairy; ovules many from 2 parietal placentas; style terete; stigma level with base of anthers, conical from a thickened base, shortly bifurcate. **Fruit** a globose or pear-shaped berry, up to size of a small orange. **Seeds** few or many, embedded in pulp. $x = 11$.

Species ± 55, Africa and Mascarene Islands; 3 in sthn Afr., Botswana, Northern Province, North-West, Gauteng, Mpumalanga, KwaZulu-Natal and Northern Cape.

Lavrania Plowes 6879050

(Asclepiadoideae—Ceropegieae)
Plowes: 123 (1986); Bruyns: 240 (1993).

Leachia Plowes: 11 (1992a) name illegitimate. *Leachiella* Plowes: 15 (1992b) name illegitimate. *Larryleachia* Plowes: 5 (1996); Bruyns: 305 (1999b).

Solitary succulents or forming small clumps up to 0.3 m tall, branching from base. **Stems** 1–many, decumbent to

erect, cylindrical to clavate; tubercles mostly < 3 mm long, flattened, rounded, polygonal, covering stem and arranged roughly into 10–19 rows along stem, each tipped with small conical to dorsiventrally flattened persistent leaf < 1 mm long, usually sunken into depression near apex. **Inflorescence** glabrous, 1–30 per stem, arising all over stems though usually concentrated towards apex (rarely basal only), bearing 1–6(–15) flowers, forming peduncular patches with many narrowly deltoid bracts (often with lateral teeth near base) and basal bract seated on tubercle like those on stem; pedicel 0.5–3 mm long. **Sepals** 1.5–2.5 mm long, overlapping slightly at bases, occasionally with ciliate margins. **Corolla** shallowly campanulate, rotate or with strongly reflexed lobes, (5–)7–16 mm diam., deeply lobed; outside glabrous and smooth; inside glabrous, smooth to papillate, papillae dome-like to obtusely conical and usually tipped with a short apical hair; tube mostly shallow, up to 3 mm deep; lobes spreading, 3–6 mm long, ovate-deltoid to lanceolate, margins reflexed so convex above, eciliate. **Corona** 1.5–3 × 2–6 mm, 2-seriate, arising from staminal column, glabrous, ± sessile at base of corolla tube; outer lobes erect, emarginate to deeply bifid into usually ascending lobules, laterally fused with bases of inner lobes and forming small pouch, dorsiventrally flattened and often channelled down inner surface; inner lobes adpressed to backs of anthers for most of anthers' length, sometimes exceeding them and rising up in centre in small column, dorsiventrally flattened, with dorsal process fused into cup with outer lobes or forming discrete, spreading, obtuse lobule in series with outer lobules. **Anthers** 2-locular, horizontal above style head, margins shrinking and exposing pollinia, rectangular. **Pollinia** D-shaped, longer than broad, pellucid margin twisting from outer edge onto dorsal surface. **Follicles** terete-fusiform obclavate, glabrous, smooth.

Species 5, in very arid western parts of sthn Afr., Namibia and Northern Cape.

Macropetalum Burch. ex Decne. 6865000

(Asclepiadoideae—Ceropegieae)
Decaisne: 626 (1844); Brown: 798 (1908).

Perennial herbs with tuberous rootstock. **Stems** slender, erect, simple or branched. **Leaves** sessile, simple, linear-filiform. **Flowers** 2–4 together, fascicled at nodes. **Calyx** shortly basin-shaped at base, with lobes longer than tube. **Corolla** with very short tube; lobes linear-filiform, reflexed against pedicel. **Corona** of 5 lobes, arising above base of staminal column and adnate to it up to base of anthers, free above; lobes opposite anthers, simple or sometimes minutely 2- or 3-toothed at apex. **Anthers** 2-locular, with an ovate, erect, membranous appendage. **Pollinia** erect, elliptic, with very short caudicles. **Style head** semiglobose. **Follicles** erect, slender, smooth.

Species 1, sthn Afr.: *Macropetalum burchellii* Decne., Northern Province, North-West, Mpumalanga, Free State and Eastern Cape.

Marsdenia R.Br. 6911000

(Asclepiadoideae—Marsdenieae)
Brown: 460 (1810); Forster: 722 (1995).

Gymnema R.Br.: 461 (1810); Brown: 782 (1908); Bullock: 65 (1953a); Schultes: 57 (1820). *Dregea* E.Mey.: 199 (1837) name conserved; Bullock: 512 (1957).

Perennial vines, lianes or subshrubs. **Leaves** petiolate, elliptic or ovate to lanceolate, sometimes cordate at base, sometimes acuminate. **Flowers** in lateral, subaxillary umbels, often 2 opposite umbels from same node in umbellate cymes, or in fascicles along branches of cymes or panicles; peduncles lateral at nodes or axillary. **Sepals** elliptic, with scales within base. **Corolla** lobed half-way or more; tube campanulate; lobes reflexed, oblong, oblong-ovate or linear, minutely notched at apex, sometimes hairy within base. **Corona** arising from corolla tube, either of 5 fleshy lobes channelled on face and adnate up to mouth of corolla tube, or of 5 pairs of fleshy ridges on lower part of corolla tube, alternating with corolla lobes. **Staminal column** arising from base of corolla. **Corona** of 5 fleshy lobes arising from and adnate to staminal column, with free tips and often with free margins, sometimes with tubercle-like projections at base which are sometimes confluent and look like an outer corona. **Anthers** 2-locular, terminated by membranous appendages which are free or connate and ± incumbent on top of style apex or applied to side of its conical tip or beak. **Pollinia** sessile, linear-oblong, ellipsoid or linear, erect in each anther theca, with short caudicles. **Style head** conical or cylindrical, mitre-shaped, produced beyond staminal column. **Follicles** often winged, smooth or sometimes hairy. **Seeds** many with narrow, marginal wing, convex-concave. $x = 11$.

Species over 300, in Mediterranean, Africa, Asia, Malesia, Melanesia, Australia and Central and South America.; 3 in sthn Afr., widespread except in Free State, Lesotho and Western Cape.

Microloma R.Br. 6752000

(Asclepiadoideae—Asclepiadeae)
Brown: 42 (1810); Brown: 549 (1907); Wanntorp: 1 (1988); Bruyns & Linder: 453 (1991).

Perennial, sinistrorsely twining climbers or much-branched, often rigid to spinescent shrubs up to 1 m high, tomentose to glabrous, greenish, later becoming covered with grey, corky bark; with clear sap; rootstock with fibrous or fusiform roots. **Leaves** mostly opposite, erect to pendent, pubescent to glabrous, slightly fleshy to coriaceous; petiole 0.5–3 mm long; blade deltoid to linear, often with auriculate base, generally small. **Inflorescence** extra-axillary, finely pubescent, 1–15-flowered. **Sepals** divided nearly to base, ± lanceolate, usually pubescent, green to pink-red. **Corolla** tube urceolate to tubular or campanulate, 5-angled with prominent ridges descending from bases of lobes, greenish yellow, green, pink or red, inside usually with 5 patches of stiff, downward-pointing golden-yellow hairs; lobes orbicular to deltoid, usually folded inwards along midrib, contorted and twisted, rarely spreading, usually connivent-erect to depressed into mouth of tube and closing it completely. **Corolline corona** present in some species, as five rounded lobes projecting from walls of corolla tube and alternating with patches of tawny hairs (hairs all round in sect. *Haemax*). **Staminal corona** 0. **Gynostegium** narrowing from base of gynostegial grooves to acute apex. **Anthers** with membranous apical appendage adpressed to style head, tipped with many intertwined hairs. **Pollinia** pendulous, mostly flat and long; corpuscle hard, black. **Follicles** fusiform, pendulous, tapering to long-acute point, glabrous. $x = 10, 11$.

Species 11 in sthn Afr., Namibia, Namaqualand (Northern Cape), Free State, Western and Eastern Cape.

Miraglossum Kupicha 6778020

(Asclepiadoideae—Asclepiadeae)
Kupicha: 625 (1984).

Perennial herbs with annual flowering shoots; sap milky. **Stems** erect, unbranched, with indumentum evenly distributed or rarely in vertical lines. **Leaves** irregularly inserted (or sometimes opposite) below inflorescence,

verticillate (rarely irregular) in inflorescence, usually hairy, occasionally glabrous; petiole short; lamina linear to narrowly triangular; margin revolute. **Flowers** in fascicles at distal nodes of stem, terminal fascicle appearing umbellate in those species that have reduced upper leaves; inconspicuous; pedicels pilose; bracteoles filiform. **Calyx** shorter than corolla; segments triangular, usually with indumentum on ventral, as well as dorsal, surface; margin ciliate. **Corolla**: lobes elliptic, characteristically reflexed at anthesis (except in *M. davyi*); dorsal surface with variable indumentum, ventral surface always densely puberulous except for a glabrous band along left hand margin (seen from centre of flower); right hand margin ciliate. **Corona** arising from staminal column; lobes thick, fleshy, not dorsiventrally or laterally compressed, alternating with petals, each representing a dorsal outgrowth from opposing stamen. **Anthers** 2-locular, with apical, membranous, often strongly undulate appendage resting on style head; anther wings horny; wings of adjacent anthers closely opposed, forming a narrow gynostegial groove between them blocked at its upper end by a corpuscle. **Pollinia** pendulous, sausage-shaped, slightly dorsiventrally compressed, without a defined germination zone; caudicels flattened, ribbon-like; corpuscle often flanged. **Follicles** densely lanate-pubescent, covered with soft, appressed bristles or bristles 0. **Seeds** many, compressed-ovoid, dark brown, rugose and with apical tuft of hairs.

Species 7, endemic to sthn Afr., eastern half of sthn Afr.

Mondia Skeels 6729000

(Periplocoideae—Periploceae)
Skeels: 45 (1911); Bullock: 203 (1961).

Chlorocodon Hook.f.: t. 5898 (1871a); Brown: 254 (1904); Brown: 541 (1907).

Tall lianas with stems up to 20 m or longer; roots tuberous. **Leaves** large, ovate, base cordate, apex caudate, petiolate, midgreen; interpetiolar stipules (colleters?) well developed, frill-like. **Inflorescences** many-flowered in axillary paniculate cymes. **Flowers** with gynostegium exserted from corolla. **Sepals** ovate. **Corolla** subrotate; lobes broadly ovate with obtuse apex, green outside, reddish brown to maroon inside with basal yellow-green nectariferous spot. **Corona** lobes arising at corolla mouth, free, fused with staminal filaments basally, broadly obcordate, white, with or without pinkish brown dorsal, corniculate segment. **Stamens** arising from base of corolla; filaments free; anthers 4-locular, triangular, glabrous, apically connivent and connate in a white cone over style head. **Style head** broadly angularly obovoid. **Follicles** narrowly ovoid, obtuse, widely to horizontally divergent. **Seeds** obliquely ovate, keeled on both faces, with apical tuft of hairs.

Species 2, tropical Africa; 1 in sthn Afr.: *Mondia whitei* (Hook.f.) Skeels, KwaZulu-Natal; lianas of the tree canopy of riverine and swamp forest.

*__Nerium__ L. 6687000

(Apocynoideae—Wrightieae)
Linnaeus: 209 (1753); Leeuwenberg: 397 (1985).

Shrubs or small trees 1–6 m high. **Leaves** ternate, petiole 3–10 mm long; lamina coriaceous, narrowly elliptic, 50–210×10–35 mm, acuminate or acute at apex, cuneate at base. **Inflorescence** terminal or axillary, thyrsoid, lax. **Flowers** actinomorphic, ornamental. **Calyx** free, narrowly triangular to narrowly ovate. **Corolla** showy, white, pink to wine-red, yellow or salmon; tube infundibuliform; lobes in bud overlapping to the right, obovate, rounded, entire; corona of 5 truncate epipetalous parts, 3–8-lobed. **Stamens** 5; filaments short, anthers 4-locular, narrowly triangular, fertile at sagittate base, introrse, with filiform apical appendages. **Ovary** broadly ovoid. **Mericarps** 2, follicular, narrowly oblong. **Seeds** oblong with 9–12 mm long tuft of hairs at truncate apex. $x = 11$.

**Nerium oleander* L., a highly poisonous but popular, evergreen garden shrub cultivated for ornament and screening, has toxic, clear, sticky sap; often occurs as an escape, and is a proposed declared invader, especially in rocky and gravelly, usually dry watercourses in semi-arid regions (Henderson 1995).

Notechidnopsis Lavranos & Bleck 6877010

(Asclepiadoideae—Ceropegieae)
Lavranos & Bleck: 255 (1985); Bruyns: 327 (1999c).

Echidnopsis Hook.f.: t. 5930 (1871b); White & Sloane: 975 (1937c).

Small, succulent perennials, wholly glabrous, forming mats or ± diffuse clumps. **Stems** 6–8-angled, procumbent or ascending, branching and re-branching, in part subterranean, entirely leafless, tesselate, tubercles convex or pyramidal, tipped with a soft green apiculus which dries and hardens with age. **Flowers** in fascicles of usually 5–15, from abbreviated, persistent peduncles near angles on upper and middle parts of stems, developing in quick succession. **Sepals** small, fleshy. **Corolla** ± 9 mm in diameter with very shallow tube completely filled by corona, almost rotate, outside greyish white to pale green, glabrous except for tube and base of lobes which are sparsely covered with short, rigid, erect bristles; inside yellowish, with obtuse, conical papillae, each tipped with an acute seta; lobes spreading to reflexed, margins folded back, without cilia. **Corona** 2-seriate, seemingly arising from surface of flat corolla and extending much above it with staminiform lobes emarginate or incised into 10 almost equal segments; these ascending with the 5 styliform lobes or incumbent on gynostegium. **Anthers** 2-locular, horizontal on style head. **Pollinia** ellipsoidal with pellucid margin along outer edge. **Follicles** erect, slender, glabrous, smooth. $x = 11$ (1 report).

South Africa, species 2, Northern and Western Cape (endemic to Namaqualand).

Oncinema Arn. 6842000

(Asclepiadoideae—Asclepiadeae)
Arnott: 261 (1834); Bullock: 184 (1963).

Glossostephanus E.Mey.: 217 (1837); Brown: 740 (1908); Phillips: 604 (1951).

Perennial, twining herb. **Leaves** shortly petiolate, slender. **Flowers** in lax cymes or racemes, lateral at nodes. **Corolla** with shallowly campanulate tube and 5 suberect, linear lobes. **Corona** of 5 lobes ± as long as staminal column; lobes free, erect, laterally compressed, linear, grooved down the back. **Anthers** 2-locular, with ovate, membranous appendages; pollinia minute; caudicles shorter than pollinia. **Style** produced into tapering, bifid column as long as corolla. **Follicles** solitary by abortion, narrowly fusiform. **Seeds** brown, linear-lanceolate, convex on back, concave on face, narrowly winged, smooth or with irregular ridges.

Species 1, sthn Afr.: *Oncinema lineare* (L.f.) Bullock; S Western Cape to Uitenhage District (Eastern Cape).

Oncinotis Benth. 6686000

(Apocynoideae—Apocyneae)
Bentham: 451 (1849); Stapf: 512 (1907); Codd: 288 (1963); Kupicha: 492 (1985).

Scandent shrubs to tall, woody climbers. **Leaves** opposite, shortly petioled or subsessile, obovate, oblong-

elliptic or elliptic, often abruptly acuminate; axillary glands 0; stipules 0. **Inflorescence** terminal or axillary, consisting of a panicle of few–many-flowered, contracted cymes. **Flowers** relatively small, inconspicuous, often greenish. **Calyx** small, divided almost to base, eglandular within or rarely with 5 minute glands; sepals 5, imbricate, oblong-lanceolate to ovate-oblong. **Corolla** salver-shaped; tube short, widest in middle, hairy without and within, with 5 ligulate scales in mouth, alternating with lobes; lobes spreading or reflexed, ± as long as tube, linear to linear-oblong, overlapping to the right. **Stamens** 5, inserted above base of corolla tube; anthers 4-locular, sessile, conniving in a cone, sublinear, apiculate, shortly sagittate with foot of connective produced into a linear appendage which lies in a channel in the anther, with a cushion of hairs at base, polliniferous in upper part only. **Disc** cupular, 5-lobed or 5-partite. **Ovary** of 2 free carpels, shortly exserted and free from disc; style very short; stigma shortly spindle-shaped with 2-lobed apiculus. **Mericarps** 2, follicular, cylindric and slender to spindle-shaped. **Seeds** lanceolate, linear or oblong with apical tuft of hairs. $x = 11$ (1 report).

Species 7, Africa and Madagascar; 1 in sthn Afr.: *Oncinotis tenuiloba* Stapf (= *O. inandensis* J.M.Wood & M.S.Evans), KwaZulu-Natal and Eastern Cape border.

Ophionella Bruyns 6889020

(Asclepiadoideae—Ceropegieae)
Bruyns: 70 (1981).

Pectinaria Haw. in part.

Dwarf, leafless, succulent perennials, glabrous in all parts except sometimes inside of flower. **Stem** acutely to obtusely 4-angled, usually procumbent, often arching and rerooting as it elongates, tuberculate and acutely toothed along angles when young, often with a distinct bud in axil of each tubercle. **Inflorescences** 1–4 per stem, arising near base, each with 1–4 flowers developing in gradual succession on a short peduncle. **Sepals** acute to ovate-acute. **Corolla**: tube ± spherical, cupular or campanulate; lobes ovate-lanceolate to lanceolate, sometimes connate at apex; interior of corolla sometimes with erect rigid hairs, white or cream with deep red patches; outside smooth to papillate, pink to white. **Corona** 2-seriate; outer corona lobes truncated, entire, joining to dorsal projection of inner lobes near base; inner lobes with large, thick, subclavate dorsal projection pointing horizontally outwards and not rising much above stigmatic surface, with broad base adnate to base of anther, forming a small channel in which anther wings are situated, with small narrow limb adnate to back of anther, usually longer than anther. **Anthers** 2-locular, ± horizontal on top of style head, rectangular, without apical appendages. **Pollinia** with short caudicles and winged corpuscle. **Follicles** erect, terete-fusiform, short, smooth.

Species 1: *Ophionella arcuata* (N.E.Br.) Bruyns, with 2 subspecies, growing between Willowmore in the west and Addo in the east (Eastern Cape).

Orbea Haw. 6885050

(Asclepiadoideae—Ceropegieae)
Haworth: 37 (1812); Leach: 4 (1985).

Diplocyatha N.E.Br.: 167 (1878); Brown: 923 (1909); White & Sloane: 722 (1937b). *Stultitia* Phillips: t. 520 (1933); Phillips: 613 (1951).

Dwarf, glabrous, succulent perennials forming compact to diffuse clumps, branching from base, often rhizomatous. **Stems** erect to prostrate, obtusely 4-angled, prominently acutely toothed along angles; teeth conical or compressed-deltoid, spreading, usually widely so, each tipped with a soft, acute to acuminate leaf rudiment, usually subtended by a pair of stipular denticles shortly below apex. **Inflorescences** 1–3(–5) per stem, developed normally from near base of stem, each with 1–40 flowers usually developing in succession. **Flowers** often humifuse, ± 10–100 mm in diameter, not or only faintly odorous. **Corolla** rotate to campanulate, often thickened below bases of lobes to form a prominent annulus; outside smooth, often streaked with purple; inside rugulose to ± smooth; lobes spreading to reflexed, ± flat above, often with vibratile clavate cilia on margins. **Corona** 2-seriate, glabrous, mostly with 10 lobes in 2 alternating series, on a mostly short stipe, generally accessible to relatively large pollinators; outer corona usually of 5 spreading to erect, ± subquadrate lobes beneath anther wings, protruding above relatively large nectarial cavity with nectarial orifice at its rear and corresponding outer corona lobe spreading from its base; inner lobes adpressed to backs of anthers, often exceeding them and rising up connivent in centre, dorsiventrally flattened to terete, often with fin-like dorsal appendage. **Anthers** 2-locular, horizontal on top of style head. **Pollinia** ± broadly ovate or subcircular, with a ± straight inner margin, as long as or slightly longer than broad. **Follicles** erect, terete-fusiform, glabrous, smooth. $x = 11$ (polyploidy).

Species 20; 18 in sthn Afr., in all countries and provinces, except Lesotho.

Orbeanthus L.C.Leach 6885060

(Asclepiadoideae— Ceropegieae)
Leach: 71 (1978a).

Glabrous succulent perennials. **Stems** obtusely 4-angled, creeping; stems and branches with adventitious roots and sharp, tuberculiform, widely spreading teeth often slightly reflexed, rarely over 3 mm long, lacking stipular denticles along angles. **Flowers** 1 or 2, usually arising towards base of stems or branches, opening successively, at least 25 mm in diameter, with a broad, smooth (not rugulose nor verrucose), glabrous annulus. **Corona** hairy, outer lobes deeply bifid, spreading-erect, greatly exceeding anthers. **Staminal column** hollowed below anther wings, with a nectarial orifice behind anther wings. **Anthers** horizontal above style head, margins often not shrinking back and frequently covering pollinia. **Pollinia** ± D-shaped, pellucid margin twisting onto dorsal surface. **Follicles** erect, terete-fusiform, glabrous, smooth. $x = 11$.

Species 2, Northern Province.

Orbeopsis L.C.Leach 6885070

(Asclepiadoideae— Ceropegieae)
Leach: 61 (1978a).

Low, caespitose, ± leafless, glabrous, succulent perennials. **Stems** obtusely 4-angled, with tubercle-like, deltoid, short teeth very prominent and widely spreading, arranged along angles of stem, usually with stipular denticles. **Flowers** few to many in umbelliform-fasciculate inflorescences, with few to many flowers opening together or in quick succession; usually rotate, lacking an annulus, with or without a distinct tube; mostly strongly foetid. **Corona** glabrous, ± cyathiform, partly or completely included, outer lobes usually broadly spreading, inner lobes erectly spreading, usually much exceeding anthers, sometimes recurved. **Staminal column** hollowed below anther wings with an inwardly directed nectarial orifice. **Anthers** horizontal above style head, margins often not shrinking back and frequently cover-

ing pollinia. **Pollinia** ± D-shaped, pellucid margin twisting onto dorsal surface. **Follicles** erect, terete-fusiform, glabrous, smooth. $x = 11$ (polyploidy).

Species 10, Angola and sthn Afr.; 9 in sthn Afr., Namibia, Botswana.

Orthanthera Wight 6862000

(Asclepiadoideae—Ceropegieae)
Wight 48 (1834); Brown: 784 (1908); Huber: 46 (1967c).

Perennial herbs with prostrate stems, or ± virgate subshrubs. **Leaves** subsessile or shortly petiolate, rarely undeveloped. **Flowers** in pedunculate or subsessile clusters or umbels, lateral at nodes. **Sepals** lanceolate with scales within base, hairy. **Corolla**: tube globose, 5-winged or -angled at base, then cylindric, hairy outside; lobes shorter than tube, linear, with reflexed margins, sometimes with minute, pocket-like thickenings at sinuses between them. **Corona** arising at or near base of staminal column and almost as long as it, of 5 lobes; lobes halfmoon-shaped or transversely oblong, reflexed outwards or V-shaped. **Anthers** 2-locular, with a subulate or lanceolate, membranous appendage. **Pollinia** erect, oblong, with pellucid, apical patch, with short caudicles. **Follicles** large, fusiform, acuminate, smooth. **Seeds** brown, ovate with a narrow, marginal wing, convex on one face, flat on other; with tuft of hairs. $x = 11$ (1 report).

Species 4, Africa and India; 2 in sthn Afr., Namibia, Botswana, South Africa excluding KwaZulu-Natal, Free State and Eastern Cape.

Pachycarpus E.Mey. 6787010

(Asclepiadoideae—Asclepiadeae)
Meyer: 209 (1838); Brown: 714 (1908); Bullock: 329 (1953b); Smith: 399 (1988); Goyder 338 (1998a).

Perennial herbs, erect, often robust, with tuberous rootstock or fusiform roots. **Leaves** petiolate or subsessile, usually distinctly penninerved. **Flowers** in 2–several-flowered umbels, lateral at nodes. **Sepals** usually with scales within base, usually ciliate, often pilose. **Corolla** usually deeply 5-lobed, sometimes with broadly campanulate tube. **Corona** arising at or from near base of staminal column, of 5 lobes; lobes shorter to longer than staminal column or nearly as long as corolla, erect or deflexed or inflexed over style head, often shortly and thickly stalked, dorsally flattened, spatulate, oblong-spatulate, broadly ovate, obovate, oblong, sometimes bluntly 3-lobed or produced into a linear lobe, usually with 2 flaps on inner face, sometimes attached by a broad foot to staminal column and consisting of 2 fleshy keels separated by a deep, narrow fissure. **Anthers** 2-locular, with membranous appendages usually resting on style head. **Pollinia** oblong or ovate-oblong, pendulous, caudicles usually shorter than pollinia. **Style head** crater-like, depressed-truncate or dome-like. **Follicles** usually solitary by abortion, ± fusiform, obtuse, winged at least in upper part, sometimes toothed or echinate along wings. **Seeds** brown, oblong, convex on back, concave on face with thickened margin, covered with short protuberances. $x = 11$ (1 report).

Species ± 30, Africa; 27 in sthn Afr., widespread, excluding Namibia and Botswana; in high grassveld.

Pachycymbium L.C.Leach 6885080

(Asclepiadoideae—Ceropegieae)
Leach: 69 (1978a); Gilbert: 20 (1990); Plowes: 103 (1993b).

Glabrous, succulent perennials. **Stems** arising from rhizomatous rootstocks, obtusely 4-angular, with tubercle-like, deltoid or broken, acute, very prominent, widely spreading teeth along angles; teeth often with stipular denticles towards apex. **Flowers** in few-flowered inflorescences, appearing together or in quick succession, shortly pedicellate, arising in small fascicles along sides of stems, usually towards apex. **Corolla** campanulate, under 25 mm in diameter, thick, rigidly fleshy, with a thickened glabrous annulus surrounding mouth of tube. **Corona** entirely enclosed in tube, deeply urceolate, inner lobes closely incumbent upon anthers, not erectly produced. **Anthers** horizontal above style head, margins often not shrinking back and frequently covering pollinia. **Pollinia** ± D-shaped, pellucid margin twisting onto dorsal surface. **Follicles** erect, terete-fusiform, glabrous, smooth. $x = 11$ (polyploidy).

Species 2, in sthn Afr., Northern Province, Gauteng and Mpumalanga; one extending to Zimbabwe.

Pachypodium Lindl. 6681000

(Apocynoideae—Echiteae)
Lindley: t. 1321 (1830); Stapf: 515 (1907); Codd: 283 (1963); Kupicha: 462 (1985).

Belonites E.Mey.: 187 (1837).

Succulent shrubs or small trees up to 6 m tall; stems usually large and swollen at base. **Leaves** alternate or spirally arranged, often in terminal fascicles, sessile or shortly petioled; axillary glands 0; stipules transformed into rigid spines in pairs, forming a swollen cushion at base. **Inflorescence** cymose, sessile or peduncled, few- or many-flowered. **Flowers** usually showy, pink, purple or yellow, or sometimes partly white. **Calyx** small, divided almost to base, eglandular within; lobes 5, ovate to linear-oblong. **Corolla** salver-shaped, funnel-shaped, or subcampanulate; tube constricted near base, cylindric or broadly cylindric below, tubular to campanulate above; lobes shorter than or almost equalling tube, overlapping to the right. **Stamens** 5, inserted above constriction; anthers 4-locular, subsessile, conniving in a cone, lanceolate, with only a short, terminal appendage, sagittate, polliniferous in upper part only, with projection near foot of connective and often a brush-like cushion below. **Disc** cupular, slightly 5-lobed or replaced by 2–5 distinct glands. **Ovary** of 2 free carpels; style cylindric or compressed, short; stigma subcylindric, with an annular rim or membrane at base, very obscurely 2-lobed; ovules many, pluriseriate. **Mericarps** follicular, cylindric or spindle-shaped. **Seeds** ovate to oblong with apical tuft of hairs. $x = 9$.

Species 18, 13 native to Madagascar; 5 in sthn Afr., arid areas or dry situations in Namibia, Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Northern, Western and Eastern Cape.

Parapodium E.Mey. 6762000

(Asclepiadoideae—Asclepiadeae)
Meyer: 221 (1838); Brown: 557 (1907).

Perennial, erect herbs with thickened rootstock. **Leaves** opposite, petiolate or subsessile, simple, sometimes margin undulate. **Flowers** in lateral umbels. **Sepals** 5, separate almost to base, sometimes nearly as long as corolla, with scales within sinuses. **Corolla** with shortly campanulate tube and with lobes spreading or recurved at tips; greenish yellow. **Corona** of 5 lobes; lobes as broad as long, or obcordate, adnate to basal portion of corolla tube, free above and slightly projecting beyond mouth of corolla tube, free from staminal column. **Anthers** 2-locular, with ovate, membranous, apical appendages. **Pollinia** pendulous, with caudicles nearly as long as pollinia. **Style** exserted beyond anther appendages or shorter and depressed at apex. **Follicles** coriaceous, with

few scattered protuberances. **Seeds** elliptic, concave-convex, with prominent ridges.

Species 3, sthn Afr., excluding Namibia, Botswana, Swaziland, Northern and Western Cape.

Pectinaria Haw. 6889000

(Asclepiadoideae—Ceropegieae)
Haworth: 14 (1819); Brown: 867 (1909); White & Sloane: 727 (1937b); Bruyns: 62 (1981).

Dwarf, mat-forming, leafless, glabrous, succulent perennials. **Stem** usually procumbent, often arching and re-rooting as it elongates, 6-angled, tuberculate-tesselate, acutely toothed along angles when young, often with a distinct bud in axil of each tubercle. **Flowers** solitary of rarely in pairs, arising between angles near stem apex. **Sepals** lanceolate, acuminate. **Corolla**: tube cupular or campanulate; lobes ovate-lanceolate to lanceolate, usually connate at apex. **Corona** 2-seriate, glabrous; outer lobes bifid into 2 slightly diverging, erect to semi-erect horns, joining to dorsal projection of inner lobes; inner lobes adnate to backs of anthers; dorsal projections divided into many semi-erect processes forming a pectinate ring with outer lobes. **Anthers** 2-locular, without apical appendages. **Pollinia** suberect or nearly horizontal, broader than long, with short caudicles and winged corpuscle. **Follicles** erect, terete-fusiform, glabrous, smooth. $x = 11$.

Species 3, Northern and Western Cape.

Pentarrhinum E.Mey. 6810000

(Asclepiadoideae—Asclepiadeae)
Meyer: 199 (1838); Brown: 741 (1908); Liede & Nicholas: 475 (1992).

Perennial, twining herbs. **Leaves** petiolate, cordate. **Flowers** in pedunculate, umbel-like cymes, lateral at nodes. **Sepals** with scales within base. **Corolla** deeply 5-lobed. **Corona** arising from base of staminal column, of 5-lobes; lobes in side view obconic, trumpet- or slipper-shaped, with infolded margins forming a channel or narrow, funnel-shaped cavity within, with truncate or rounded upper margin and with an inward-directed horn. **Anthers** 2-locular, with inflexed, ovate, membranous appendage. **Pollinia** terete, linear, pendulous; caudicles shorter than pollinia. **Follicles** lanceolate, ± beaked and echinate. **Seeds** brown, ovate, planoconvex, narrowly winged, with scattered, raised markings. $x = 9$ (1 report).

Species 3, Africa; 2 in sthn Afr., widespread except in Lesotho and Western Cape.

Pergularia L. 6917000

(Asclepiadoideae—Asclepiadeae)
Linnaeus: 135, 191 (1767a); Brown: 757 (1908); Huber: 48 (1967c).

Twining perennial herbs. **Leaves** petiolate, simple, cordate-subacuminate. **Flowers** in long, pedunculate corymbs or racemes, sublateral at nodes. **Sepals** with scales within base. **Corolla** 5-lobed to ± halfway; tube cylindric to campanulate; lobes elliptic, fimbriate or ciliate. **Corona** 2-seriate; outer corona arising at base of staminal column, membranous, annular, 5-lobed; inner corona lobes 5, erect, fleshy, adnate to base of staminal column, free above, horn-like, incurved, produced into a spreading, deflexed spur or pouch at base. **Staminal column** arising in mouth of corolla tube and exserted. **Anthers** terminated by a transversely oblong, membranous appendage inflexed over style head. **Pollinia** transversely oblong, pendulous, with obsolete caudicle. **Style head** 5-angled, dome-shaped. **Follicles** somewhat ovoid, sometimes acuminate, smooth or echinate. **Seeds** ovate, with toothed marginal wing, hairy. $x = 11$ (aneuploids).

Species 5, Africa to India and Madagascar; 1 in sthn Afr.: *Pergularia daemia* (Forssk.) Chiov.; widespread except in Free State, Lesotho, Northern, Western and Eastern Cape.

Periglossum Decne. 6783010

(Asclepiadoideae—Asclepiadeae)
Decaisne: 520 (1844); Brown: 581 (1907).

Perennial herbs, with tuberous rootstock, producing single, erect stems. **Leaves** sessile, slender. **Flowers** few to many, in 2–4 globose umbels, arranged racemosely along upper part of stem. **Sepals** often with scales within base. **Corolla** 5-lobed nearly to base. **Corona** shortly connate at base, 5-lobed, sometimes almost as long as corolla lobes; lobes erect, spatulate-oblong or sagittate, or oblong-linear, with a transverse ridge or flap and often 2 keels on inner face, sometimes reflexed at apex, sometimes with process at base. **Staminal column** arising from base of corolla. **Anthers** 2-locular, with terminal, membranous appendages which are inflexed on style head. **Pollinia** pendulous, curved, sausage-shaped, attached to corpuscle by doubly curved caudicles twice as long as pollinia. **Follicles** narrowly fusiform, tapering to a beak. **Seeds** concave on one side, convex on other, with short protuberances and a pleated rim round concave surface.

Species 4, Africa, all in sthn Afr., in all countries and provinces.

Petopentia Bullock 6730020

(Periplocoideae—Periploceae)
Bullock: 362 (1954).

Pentopetia Decne. in part; Schlechter: 257 (1894b). *Tacazzea* Decne. in part; Brown: 541 (1907).

Lianas with stems up to 10–15 m long; roots tuberous, often with subspherical part above ground, up to 0.6 m in diameter. **Leaves** semicoriaceous, petiolate, with axillary tooth-like and hair-like colleters, with interpetiolar line; blade broadly oblong, base broadly rounded and truncate to cordate, apex rounded and cuspidate, dark green, glabrous and glossy, secondary veins patent. **Inflorescences** axillary at terminal nodes, few-flowered. **Flowers** with gynostegium exserted from corolla. **Sepals** broadly ovate, semisucculent, pale green. **Corolla** rotate, pale green to yellow; lobes narrowly triangular to triangular-ovate, apex acuminate. **Corona** lobes arising from corolla mouth, erect, filiform. **Stamens** arising at base of corona lobes, free; anthers 4-locular, triangular, glabrous. **Style head** broadly pentangularly ovoid with conical or bifid apex. **Follicles** paired, widely diverging, vary narrowly ovoid with acuminate or acute apex. **Seeds** subovoid, blackish brown, tuft of silvery white hairs.

Species 1: *Petopentia natalensis* (Schltr.) Bullock, KwaZulu-Natal and Transkei region of Eastern Cape; humid, subtropical areas.

Piaranthus R.Br. 6881000

(Asclepiadoideae—Ceropegieae)
Brown: 12 (1810); Brown: 1015 (1909); White & Sloane: 783 (1937b); Meve: 57 (1994); Bruyns: 395 (1999d).

Huerniopsis N.E.Br.: 171 (1878); Brown: 499 (1903); Brown: 922 (1909); White & Sloane: 965 (1937c); Huber: 40 (1967c).

Dwarf, mat-forming, glabrous, succulent perennials. **Stems** cylindrical, sometimes clavate, roundly 4- or 5-angled, angles marked by triangular scars of rudimentary leaves. **Inflorescence** cymose-thyrsoid cyme, 1–3 per stem, on upper parts; floral bracts lanceolate, ± 1 mm

long. **Flowers** 1–5, produced on rudimentary peduncles, usually opening in succession. **Sepals** ovate-lanceolate, acuminate, with scales within base. **Corolla** rotate and deeply lobed to campanulate, tubular or with nearly flat base, 5-lobed in apical part, usually hairy on inner surface; lobes ovate or lanceolate, acuminate, often with revolute margins. **Corona** 1-seriate, yellow, arising from staminal column, of 5 lobes incumbent on anthers, rarely with erect tips, sometimes toothed, dorsally produced or expanded into a truncate, minutely tuberculate or denticulate crest. **Staminal column** arising from base of corolla. **Anthers** 2-locular, ± horizontal on top of style head, without appendages. **Pollinia** ellipsoid, with short caudicles. **Style head** a 5-lobed disc. **Follicles** paired, green, sometimes spotted red, glabrous. **Seeds** flat, ovate, winged, narrowly brown, slightly sculptured; tuft of hairs 10–16 mm long. $x = 11$ (polyploidy).

Species 6; 6 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Mpumalanga, Free State, Northern, Western and Eastern Cape.

Quaqua N.E.Br. 6884010

(Asclepiadoideae—Ceropegieae)

Brown: 8 (1879); Bruyns: 35 (1983); Gilbert: 1 (1990); Plowes: 83 (1993a); Bruyns: 311 (1999e).

Succulent, sometimes spiky subshrubs or shrubs, branching at or above base to form clumps. **Stems** 4(5 or 6)-angled, not stoloniferous, glabrous, leafless, grey to purplish, with angles rounded, bearing stout, convex tubercles each armed with a hardened, conical, horizontal to decurved, yellow-brown tooth, each tooth sometimes flanked by two denticles, tubercles from adjacent angles meeting in middle of stem with well-defined groove. **Inflorescences** 1–20 per stem, glabrous, mainly in upper part of stem. **Flowers** solitary or produced in fascicles arising from peduncular patches in groove in middle of stem formed by tubercles. **Corolla** variously expanding, depending on number of flowers in fascicle, frequently papillate and spiculate, rarely hairy within, 7–25 mm diam., mostly much smaller than diameter of stems; tube rarely absent, bowl-shaped to conical, up to 5 mm deep; lobes ovate-lanceolate to linear-acute, margins sometimes ciliate, sometimes conspicuously folded back, 3–15 mm long. **Corona**: outer lobes deeply bifid, to shallowly bifid or entire and entirely enclosing space between inner lobes to form cup around column, arising near base of inner lobes; inner lobes adpressed to backs of anthers for most of length of anthers, occasionally initially incumbent and then rising up in centre in a small column, mostly dorsally flattened. **Anthers** 2-locular, horizontal on top of style head, rectangular. **Pollinia** ellipsoidal, with pellucid margin along outer edge. **Follicles** terete-fusiform, erect, diverging at up to 90°. **Seeds** flattened, brown, finely papillate on surface, with tuft of hairs. $x = 11$.

Species 19, Namibia, North-West, Northern, Western and Eastern Cape.

Raphionacme Harv. 6747000

(Periplocoideae—Gymnanthereae)

Harvey: 22 (1842); Brown: 268 (1904); Brown: 532 (1907); Huber: 5 (1967b); Retief & Venter: 326 (1983); Venter & Verhoeven: 149 (1986a); Venter & Verhoeven: 332 (1986b); Venter & Verhoeven: 177 (1987); Venter & Verhoeven: 603 (1988a); Venter & Verhoeven: 607 (1988b); Verhoeven & Venter: 123 (1988).

Geophyte with aerial stems seasonal, climbing, erect or decumbent; root tuber napiform to cylindrical-ovoid; subterranean stems perennial. **Leaves** petiolate, lamina linear to ovate to broadly ovate or elliptic to obovate, herbaceous, glabrous or variously hairy, base rounded to cuneate, apex obtuse, rounded or acute to acuminate. **Inflorescences** racemose to capitulate, terminal and/or axillary, few- to many-flowered. **Flowers** with gynostegium exserted from corolla. **Sepals** glabrous to hairy. **Corolla** green, brown, white, yellow, pink, violet to blue; tube cylindrical to campanulate, with nectariferous swellings on inner face below filament bases, longitudinally channelled with pockets at base; lobes ovate to obovate to triangular, apex obtuse to rounded. **Corona** arising in corolla mouth, lobes free, entire, bifid, trifid or trisegmented and variously shaped, e.g. filiform, ovate, lobular and corniculate; colours as in corolla. **Stamens** arising at mouth of corolla tube and adnate to bases of corona lobes; filaments filiform, sometimes dilated at base; anthers 4-locular, hastate, triangular or ovate, glabrous. **Style**s long, fused from low down, often glandular. **Style head** pentangularly ovoid, apex obtuse. **Follicles** paired and widely diverging or solitary and erect, narrowly ovoid to linear-ovoid or obovoid with acuminate apices. **Seeds** narrowly subovoid, with tuft or ring of hairs.

Species 39, Africa, 1 in Arabian Peninsula, with the majority occurring south of the equator; 18 in sthn Afr., mostly found in arid to subhumid savanna, a few in desert, a few in swampy habitat: Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Northern and Eastern Cape.

Rauvolfia L. 6619000

(Plumerioideae—Alyxieae)

Linnaeus: 208 (1753); Stapf: 501 (1907); Codd: 274 (1963); De Kruif: 458 (1985); Van Dilst & Leeuwenberg: 21 (1991).

Ophioxylon L.: 1043 (1753). *Dissolaena* Lour.: 137 (1790). *Cyrtosiphonia* Miq.: 401 (1857). *Heurckia* Müll.Arg.: 53 (1870).

Trees or shrubs, usually glabrous. **Leaves** opposite or whorled, often large, shortly petioled, penninerved; axillary glands many in a dense fringe or in clusters; stipules 0. **Inflorescence** a terminal or pseudoaxillary, peduncled, usually many-flowered, simple or compound umbel or corymb, rarely a raceme. **Flowers** small, white or yellowish. **Calyx** small, divided almost to base or united into a shallow, 5-toothed cup, eglandular within; sepals or segments imbricate. **Corolla** salver-shaped; tube cylindric, slightly widened below mouth, very rarely just below middle; mouth constricted, without appendages; lobes shorter than tube, overlapping to the left. **Stamens** in widened part of tube; filaments short, terete; anthers 4-locular, free from stigma, ovate, acute to obtuse, shortly 2-lobed at base. **Disc** annular or cup-shaped, entire or slightly lobed. **Ovary** of 2 free or coherent carpels; style subterete; stigma capitate or shortly cylindric, minutely papillose and slightly viscous, with a basal, deflexed rim and a very short, slightly bilobed apiculus arising from a shallow depression; ovules 2 in each locule, collateral. **Mericarps** 2 (or often 1 by abortion) free, or ± united, drupaceous; pyrenes crustaceous, 1- or 2-seeded, ± compressed. **Seeds** ovoid. $x = 11$ (aneuploids, high polyploidy).

Species ± 60, pantropical, 7 in Africa, 3 in Madagascar; 1 in sthn Afr.: *Rauvolfia caffra* Sond. (= *R. natalensis* Sond.); Northern Province, North-West, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Rhyssolobium E.Mey. 6890000

(Asclepiadoideae—Marsdenieae)

Meyer: 217 (1838); Brown: 784 (1908).

Shrublets, much branched, whitish puberulous. **Leaves** opposite or subfasciculate, small, thick, with revolute margins. **Flowers** 1–3, subsessile at nodes. **Sepals** lanceolate, acute, thick. **Corolla** 5-lobed, somewhat fleshy with campanulate tube; lobes slightly spreading,

densely bearded within. **Corona** 0. **Staminal column** arising from base of corolla; filaments with horny margin on upper part. **Anthers** 2-locular, with membranous appendage. **Pollinia** erect, with short caudicles and corpuscle.

Species 1: *Rhyssolobium dumosum* E. Mey., Namibia and Northern Cape (Namaqualand); very arid, windswept coastal plains with night fog.

Riocreuxia Decne. 6875000

(Asclepiadoideae—Ceropegieae)
Decaisne: 640 (1844); Brown: 799 (1908); Dyer: 83 (1980); Dyer: 227 (1983).

Ceropegia in sense of Huber: 167 (1957) in part.

Perennials, herbaceous or becoming somewhat woody, twining or with several suberect branches from rootstock with long fleshy roots. **Leaves** mostly cordate at base. **Flowers** in laxly branched cymes or in fascicles at 2 or 3 nodes of flowering axis. **Sepals** usually with scales within base. **Corolla** with ± inflated tube; lobes ± as long as tube, usually connate at tips. **Corona** (1)2- or 3-seriate, arising from and ± as long as staminal column; outer corona a shallowly 5-lobed, basin-shaped structure or a 5-lobed collar, with lobes shortly or deeply divided; inner corona lobes linear or subulate or shortly linear-oblong, incurved over anthers, rarely obsolete. **Anthers** 2-locular, tipped with a short, fleshy appendage or apiculus. **Pollinia** subglobose or ellipsoid; caudicles short. **Follicles** terete or fusiform, acuminate, ± beaded, smooth. **Seeds** linear or oblong, convex on one side, flat on other, winged, with tuft of hairs at apex.

Species ± 10, Africa, 1 in India; 7 in sthn Afr., widespread.

Sarcostemma R.Br. 6849000

(Asclepiadoideae—Asclepiadeae)
Brown: 462 (1810); Brown: 755 (1908).

Perennial, ± leafless, ± glabrous succulents or subsucculents, trailing or twining, or occasionally shrubby. **Leaves** rudimentary. **Flowers** in lateral or terminal, sessile umbels. **Sepals** narrowly ovate-triangular, with scales within base. **Corolla** deeply lobed; lobes oblong or oblong-elliptic, margins recurved. **Corona** 2-seriate, arising from filament part of staminal column; outer corona annular, cup- or basin-shaped, 5-angled, truncate or shortly lobed; inner corona attached to staminal column almost throughout, of 5 fleshy, compressed or keeled lobes, enclosed at base by outer corona. **Anthers** 2-locular, with membranous, ovate, inflexed or ascending appendages. **Pollinia** very narrowly ovate, pendulous; caudicles shorter than pollinia; corpuscle very narrowly ovate, deep maroon. **Follicles** narrowly fusiform, usually bluntly beaked, often with somewhat membranous surface. **Seeds** compressed, ovate, narrowly winged, smooth. $x = 11$ (9, 10).

Species 10, in arid parts of Old World; 2 in sthn Afr., 1 widespread except in southwestern region of Western Cape.

Schizoglossum E.Mey. 6778000

(Asclepiadoideae—Asclepiadeae)
Meyer: 218 (1838); Brown: 588 (1907); Kupicha: 600 (1984).

Perennial herbs with flowering shoots produced annually from a tuber and dying back each year; all parts exuding a milky latex. **Stems** erect, simple or sparsely branched, with opposite and decussate lines of indumentum throughout. **Leaves** simple, entire, opposite and decussate or less often verticillate or irregularly inserted; petiole short; leaf base often sagittate, apex acute or obtuse, margin usually revolute; upper leaf surface usually with an indumentum of appressed scabrid hairs; lower leaf surface with pilose midrib, lamina ± glabrous except for sparsely pilose lateral nerves. **Inflorescences** extra-axillary umbels, always pedunculate (except in *S. bidens* subsp. *pachyglossum*), several to many per stem, few- to many-flowered; bracteoles filiform, inconspicuous; inflorescence axes pilose. **Calyx** shorter than corolla; segments triangular, dorsally appressed-pilose, ventrally glabrous, with ciliate margin. **Corolla** contorted in bud, with lobes overlapping to the left; lobes elliptic, either flat or slightly cucullate or replicate, with variable indumentum; when margin ciliate, hairs present on both right- and left-hand margins. **Corona** lobes alternating with petals, each representing a dorsal outgrowth from opposing stamen; form of corona variable, lobes dorsiventrally flattened and often with 1 or 2 appendages on ventral face. **Stamens** united at base to form a hollow column from which corona lobes arise; each anther comprising a central area of 2 thecae, each containing one pollinium, an apical membranous appendage lying against or cupped over gynostegium, and two horny lateral margins; margins of adjacent anthers closely opposed, forming a narrow gynostegial groove between them, blocked at its upper end by a corpuscle. **Pollinia** pendulous, obtriangular, ellipsoid, reniform or sausage-shaped, dorsiventrally compressed, always with a germination zone present on circumference but never at point of attachment to caudicle; caudicles short, slender or somewhat flattened; corpuscle sometimes flanged. **Ovary** of 2 free carpels concealed within staminal column; styles tapering upwards, then uniting and broadening into a flat or umbonate style head. **Follicles** covered with long, soft appressed bristles, surface of carpel and bristles densely crispate-pubescent; fruiting peduncle elongating and pedicels becoming once-coiled at apex. **Seeds** many, compressed-ovoid with dark brown rugose testa and apical tuft of hairs of fine white hairs.

Species ± 80, Africa; 27 in sthn Afr., widespread and mainly in grassland, excluding Namibia and Botswana.

Secamone R.Br. 6860000

(Secamonoideae)
Brown: 44 (1810); Brown: 542 (1907); Endlicher 589 (1838); Goyder: 437 (1992).

Lianes and twining shrubs with milky latex. **Leaves** sessile or subsessile. **Flowers** in 2–many-flowered cymes, axillary and terminal, rarely flowers solitary. **Sepals** ovate to suborbicular, usually with alternisepalous colleters. **Corolla** with shallow, campanulate tube or divided nearly to base, sometimes with a flap in mouth of tube alternating with lobes; lobes oblong, usually with fleshy, submarginal ridges and sometimes also with decurrent, central ridge. **Corona** of 5 simple inner lobes ± adnate to staminal column; lobes usually laterally compressed and curved inwards, sometimes small; outer lobes rarely present as small ridge beneath gymnostegial grooves. **Stamens** arising on staminal curtain surrounding ovaries and adaxially fused to sides of style head. **Anthers** 4-locular, with fimbriate, membranous appendages which are sometimes connate. **Pollinia** 2 in each theca, erect, not surrounded by waxy outer wall; caudicles almost obsolete; corpuscle soft, white, usually larger than pollinia. **Style head** variably shaped, with thick cylindrical part just above ovaries widening slightly towards apex, narrowing above this into usually bifid apex, with 5 stigmatic zones on sides of lower cylindrical part; pollinarium consisting of a small corpuscle, rarely with one or two small caudicles. **Ovary** apocarpous, semi-inferior. **Follicles** paired, fusiform or nar-

rowly cylindric, often acuminate; ventrally dehiscent. **Seeds** brown, compressed, lanceolate or linear, convex-concave or biconvex, with a single rib on one side, sometimes pubescent, with a tuft of hairs.

Species ± 100 in warmer regions of Old World, Africa and Madagascar; 5 in sthn Afr., widespread except in Namibia, Free State and Lesotho.

Sisyranthus E.Mey. 6861000

(Asclepiadoideae—Ceropegieae)
Meyer: 197 (1838); Brown: 786 (1908).

Perennial herbs, with fusiform roots and usually a single, unbranched, slender stem. **Leaves** sessile, slender. **Flowers** in 2–more-flowered, subsessile or pedunculate, lateral or terminal umbels. **Sepals** 5, ovate or lanceolate, often acuminate. **Corolla** cream, with urceolate or campanulate tube, sometimes with decurrent ridges within, alternating with lobes, often bearded within mouth or with 5 small tufts of hairs in throat; lobes 5, oblong or ovate, sometimes hairy on face. **Corona** partly adnate to staminal column by lower, central part of face and as long as or longer than staminal column, of 5 lobes; lobes ovate, deltoid-ovate, oblong, rhomboid, or broadly cuneate, obtuse or acute, entire or 3-toothed with lateral teeth small and central tooth large or prolonged into a subulate or filiform, erect or incurved point. **Anthers** 2-locular, with membranous, apical appendage. **Pollinia** erect, terete, linear or oblong, sometimes curved, often pellucid on one margin; caudicles shorter than pollinia. **Follicles** slender, smooth, tapering into beak. **Seeds** with tuft of hairs.

Species 13, tropical Africa and sthn Afr., widespread in grassland, excluding Namibia and Botswana.

Sphaerocodon Benth. 6896000

(Asclepiadoideae—Marsdenieae)
Bentham: 772 (1876); Brown: 773 (1908).

Perennial herbs with a woody or tuberous rootstock; stems erect, often flexuous, not twining. **Leaves** shortly petiolate, elliptic or obovate. **Flowers** in sublateral, pedunculate, umbel-like cymes. **Sepals** ovate-lanceolate, with scales within base. **Corolla** 5-lobed to ± halfway; tube campanulate. **Corona** of 5 small, fleshy tubercles arising from staminal column somewhat above its base. **Staminal column** arising from base of corolla tube; anthers with membranous margins, without apical appendages. **Pollinia** ellipsoidal, erect, with short caudicles. **Follicles** fat, single, pendulous.

Species 2, Africa; both in sthn Afr., Namibia, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Stapelia L. 6885000

(Asclepiadoideae—Ceropegieae)
Linnaeus: 217 (1753); Brown: 924 (1909); White & Sloane: 409 (1937b); Leach: 4 (1985).

Low, succulent, perennial herbs, branching sympodially from base, but not at all rhizomatose (except somewhat in *S. engleriana*). **Stems** pubescent or rarely glabrous, 4(5 or 6)-angled, ± parallel-sided or slightly tapering, neither tessellately marked nor sharply sulcate down sides, tubercle-toothed along angles. **Leaves** erect (spreading in *S. engleriana*), rudimentary, fleshy, pubescent, caducous or marcescent, decussately or spirally (5- or 6-angled) arranged at apex of tubercle teeth, with a pair of small, usually persistent, stipular glands at their base. **Inflorescence** a successively flowering, shortly pedunculate, pubescent cyme, arising mostly from near base, but in some species randomly disposed along stem; flowers mostly foetid. **Corolla** very variable in size (8–400 mm diameter), mostly deeply lobed, rotate, rarely campanulate, shallowly cup-shaped or funnel-shaped, in one species globose-campanulate, sometimes strongly recurved, usually transversely rugose, mostly to some extent hairy, sometimes densely so, yellowish, brownish, reddish or purplish. **Corona** 2-seriate, shortly raised on a pentagonal pedestal, 10-lobed, with 5 outer lobes simple or very rarely bifid, and inner closely incumbent on backs of anthers, sometimes shorter than or scarcely exceeding them, but mostly produced above them into a horn-like extension, often with a prominent dorsal wing or secondary horn or variably gibbous near base. **Anthers** 2-locular, horizontal on top of style head, rectangular. **Pollinia** obliquely ovate, compressed. **Follicles** fusiform, erect, sparsely pubescent or puberulous, very rarely glabrescent. $x = 11$ (aneuploids, polyploidy).

Species 43, Africa; most from sthn Afr., widespread in drier areas, except Lesotho.

Stapeliopsis Pillans 6885020

(Asclepiadoideae—Ceropegieae)
Pillans: 32 (1928); White & Sloane: 721 (1937b); Phillips: t. 445 (1932); Bruyns: 73 (1981).

Leafless, succulent perennials, sometimes rhizomatous, forming clumps or mats. **Stems** 4-angled, erect or ascending, with flattish sides, minutely papillate; angles with tubercles tapering to small, tooth-like, rudimentary leaf bases. **Inflorescences** 1(3) per stem, arising near base of stem, glabrous to minutely pubescent, with 1–6 flowers opening in gradual succession. **Sepals** ± lanceolate, acuminate. **Corolla** ellipsoidal, ovoid to cylindrical or campanulate with short triangular lobes sometimes joined at tips, exterior glabrous except in *S. neronis*, interior either covered with prominent papillae becoming smaller towards base of tube where they are tipped with a stiff hair, or without papillae but always with stiff hairs and covered with fine spicules. **Corona** 2-seriate; outer lobes either each reduced to a small, truncate (sometimes bifid) tooth at base of inner lobes or modified to form cup containing at least lower half of staminal column, lobes appearing as small indentations or teeth around mouth of cup; inner lobes joined dorsally near their base to outer corona tube or meeting outer lobes laterally near their base, touching anthers only near their base, limb of lobes rising up above stigmatic surface, usually meeting in centre, laterally flattened with rounded tips. **Anthers** 2-locular, horizontal on top of style head, rectangular, without appendages. **Pollinia** ellipsoidal. **Follicles** erect, terete-fusiform, borne on much-elongated pedicel, glabrous, smooth. $x = 11$.

Species 6, sthn Afr., Namibia, North-West, Northern, Western and Eastern Cape.

Stathmostelma K.Schum. 6793000

(Asclepiadoideae—Asclepiadeae)
Schumann: 129 (1893); Goyder: 607 (1998b).

Perennial herbs with a single annual stem arising from a vertical tuber; latex milky. **Stem** branched below, erect or ascending, glabrous or minutely pubescent with short, white hairs. **Leaves** petiolate, linear, acute, base truncate or rounded, pubescent with spreading white hairs. **Inflorescences** terminal or extra-axillary, umbels erect, borne on long or short peduncles. **Calyx** lobed to base. **Corolla** rotate to campanulate, outer face greenish, chrome-yellow within. **Staminal column** with stipe 1–2 mm long. **Corona** of 5 lobes arising above base of staminal column; erect and somewhat fleshy, appearing concave-cucullate for most of its length but in fact solid except

for papillose, proximal and upper margins, inner apical margins extending over head of column as a pair of teeth, cavity sinus without a well-developed central tooth, glabrous except along midline of cavity towards base of lobe. **Anthers** 2-locular; corpuscle subcylindrical, black; caudicle with a membranous, convex and somewhat contorted proximal portion broadening abruptly into a short clasping overlap with pollinium; pollinia flattened, oblong. **Style head** flat. **Follicles** single, erect, fusiform, beaked, not inflated, smooth, minutely pubescent when young, glabrous at maturity; fruiting pedicel not contorted. **Seeds** ovate with a verrucose disc and a narrow inflated rim; tuft of hairs of silky hairs.

Species 13, in eastern tropical Africa; 1 in sthn Afr.: *Stathmostelma fornicatum* (N.E.Br.) Bullock subsp. *fornicatum*, Botswana.

Stenostelma Schltr. 6789000

(Asclepiadoideae—Asclepiadeae)
Schlechter: 6 (1894a); Bullock: 342 (1953b).

Krebsia Harv.: 233 (1868).

Perennial herbs with thickened rootstock. **Leaves** shortly petiolate, linear. **Inflorescence** of very shortly pedunculate subglobose umbels lateral at nodes. **Calyx** 5-partite; segments linear-lanceolate to lanceolate, with scales within at base. **Corolla** 5-lobed; lobes green without, white within, ovate-oblong, recurved at tips and sometimes notched at apex; tube shallowly basin-shaped. **Corona** 5-lobed, arising at or near base of staminal column, exceeding corolla lobes, simple, erect, narrowly elliptic or lanceolate, keeled all down back and ± acutely triquetrous in cross section, with a rhomboid wing-like dilation on back at base, tapering above into an acute incurved-hooked apex, without an appendage on inner face; purplish. **Anthers** 2-locular, with a membranous ovate appendage. **Pollinia** pendulous, oblong or oblong-ovate; caudicles shorter than pollinia. **Style head** slightly projecting above staminal column, depressed-truncate, with 5 short, thick, fleshy lobes.

Species 2, Namibia and Botswana to Eastern Cape.

Stigmatorhynchus Schltr. 6911010

(Asclepiadoideae—Marsdenieae)
Schlechter: 141 (1913); Bullock: 373 (1954); Huber: 65 (1967c).

Shrublets or shrubs, stiffly twiggy. **Leaves** shortly petiolate, ± spatulate, shortly pubescent. **Flowers** small, few together in subsessile or shortly pedicellate, extra-axillary umbels or fascicles. **Calyx** much shorter than corolla, puberulous, 5-parted. **Corolla** narrowly campanulate, 5-lobed to about middle, glabrous outside, bearded within. **Corona** of 5 fleshy lobes arising from and adnate to staminal column, with free tips. **Staminal column** arising from base of corolla. **Anthers** with a cartilaginous margin, terminated by membranous appendages which are applied to base of elongated beak; pollinia small, ± ellipsoid, erect-inclined, with short, slender caudicles and a small corpuscle. **Staminal column** elongate, subcylindric; carpels 2-ovulate. **Fruit** of 2 one-seeded follicles.

Species 3, Africa; 1 in sthn Afr: *Stigmatorhynchus hereroensis* Schltr., Namibia.

Stomatostemma N.E.Br. 6741000

(Periplocoideae—Cryptolepideae)
Brown: 252 (1902); Brown: 530 (1907).

Lianas or shrubs; roots simple; stems up to ± 5 m long. **Leaves** glabrous, semicoriaceous, petiolate, with reddish dentate interpetiolar ridges; blade linear, narrowly ovate, elliptic or obovate, apex acute to acuminate to cuspidate, base cuneate to rounded. **Inflorescences** terminal to axillary, few- to many-flowered. **Flowers** with gynostegium enclosed in corolla tube. **Sepals** narrowly triangular to narrowly ovate. **Corolla** creamy white to yellowish green with purplish centre or completely white; tube campanulate with nectariferous swellings on inner face at filament bases; lobes very narrowly oblong-ovate to ovate, apex obtuse. **Corona** lobes arising from corolla sinuses, clavate. **Stamens** arising from nectariferous swellings near base of corolla tube; filaments free; anthers 4-locular, narrowly triangular, glabrous. **Style head** pentangularly ovoid, apex acute to obtuse. **Follicles** paired, slightly diverging, angularly cylindrical-ovoid. **Seeds** narrowly subovoid.

Species 2, Zambia, Mozambique and Zimbabwe; 1 in sthn Afr., Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland and KwaZulu-Natal; dry woodland of sandy plains and mountain sides.

Strophanthus DC. 6688000

(Apocynoideae—Wrightieae)
Candolle:122, t. 8 (1802); Stapf: 509 (1907); Codd: 289 (1963); Beentje: 468 (1985).

Cercocoma Wall. ex G.Don: 84 (1837). *Christya* Ward & Harvey: 134 (1842). *Roupellia* Wall. & Hook.: t. 4466 (1849). *Zygoneurion* Baill.: 758 (1888).

Shrubs or woody climbers; bark often becoming corky with age. **Leaves** opposite, rarely ternate, shortly petioled; axillary glands 2–6, rarely more, subulate, scale-like or conical; stipules 0. **Inflorescence** terminal, often at end of branchlets, corymbose, many- or few-flowered or reduced to solitary flowers. **Flowers** mostly showy. **Calyx** divided to base with few to many glands at base within; sepals imbricate, linear or linear-lanceolate, sometimes foliaceous. **Corolla** funnel-shaped or campanulate, with a short or long cylindric, basal tube; mouth with paired appendages alternating with lobes; lobes much longer than tube, attenuate, linear or produced into filiform, usually spirally twisted, appendages. **Stamens** inserted deep in corolla tube; filaments short, linear; anthers 4-locular, conniving in a cone, lanceolate, acuminate, with a long or short, apical appendage, bluntly or acutely sagittate at base, with foot of connective produced into an appendage or horizontal ridge and often hairy at base. **Disc** 0. **Ovary** of 2 free carpels with many ovules in each; style filiform, shorter than stamens; stigma capitate, 5-grooved, with membranous, reflexed frill at base and a minutely bifid apiculus. **Mericarps** 2, follicular, divaricate, oblong or spindle-shaped, sometimes pustulate. **Seeds** spindle-shaped, or flat and lanceolate, with an apical, plumose awn, and with or without a deciduous, basal tuft of hairs at maturity. $x = 10$ (9, 11).

Species 38, Asia, Africa, Madagascar, 30 species in Africa; 6 in sthn Afr., Namibia, Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Tabernaemontana L. 6603000

(Plumerioideae—Tabernaemontaneae)
Linnaeus: 210 (1753); Codd: 268 (1963); Leeuwenberg: 438 (1985); Leeuwenberg: 1 (1991).

Pandaca Noronha ex Thouars: 10 (1806). *Conopharyngia* G.Don: 98 (1837); Stapf: 505 (1907).

Shrubs or trees. **Leaves** opposite, relatively large, shortly petioled, penninerved; stipules united into a very short, tubular sheath, usually with many resiniferous glands within. **Inflorescence** a terminal or pseudo-axillary corymb, rarely a panicle, or reduced to a few-

flowered cyme. **Flowers** fragrant, usually large and showy or medium-sized. **Calyx** relatively small with several minute glands at base inside; sepals almost free, ovate, imbricate. **Corolla** salver-shaped, usually white, often fleshy; tube cylindric, spindle- or barrel-shaped, widest at or below middle, sometimes twisted, naked in mouth, usually tomentose within; lobes overlapping to the left, as long as tube, elliptic, with a broad ear on one side. **Stamens** included or shortly exserted, ± free or conniving into a cone inserted in widest part of tube, subsessile; filaments reduced to a callus swelling; anthers 4-locular, ovate-lanceolate, apiculate, sagittate at base. **Disc** present or absent. **Ovary** of 2 free carpels; style relatively short, compressed; stigma cylindric, grooved, with an entire or lobed, projecting rim or short frill at base and a minute 2-lobed apiculus, more rarely elliptic or globose, delicately papillose, not grooved, usually with a toothed rim at base and a conspicuous, 2-fid, papillose apiculus as long as or longer than rest of stigma; ovules many in each locule. **Mericarps** 2, baccate, usually ± globose or ovoid, smooth or rarely keeled or warty, with milky latex. **Seeds** many, embedded in a fleshy pulp, ± ellipsoid, deeply grooved ventrally, with many narrow grooves on back. $x = 11$ (polyploidy).

Species ± 110, pantropical, 18 in Africa, 15 in Madagascar, 1 in Mascarene Islands; 2 in sthn Afr., Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Tacazzea Decne. 6730000

(Periplocoideae—Periploceae)
Decaisne: 492 (1844); Brown: 260 (1902); Brown: 540 (1907); Bullock: 350 (1954); Venter *et al.*: 93 (1990).

Tall lianas or erect shrubs; roots tuberous; stems up to ± 20 m long. **Leaves** mostly opposite, sometimes alternate; petiolate with toothed interpetiolar ridges; lamina linear-ovate, narrowly to broadly ovate or elliptic to broadly elliptic, adaxially glabrous to puberulous, abaxially puberulous, base cuneate, obtuse or cordate, apex apiculate, acuminate to obtuse or emarginate and mucronate. **Inflorescences** terminal and axillary many-flowered panicles. **Flowers** with gynostegium exserted from corolla. **Sepals** broadly ovate, glabrous to puberulous. **Corolla** pale green, pale yellow or reddish; tube very shallow; lobes broadly ovate to oblong-ovate, apex obtuse. **Corona** lobes arising from corolla mouth, filiform or narrowly ovate; interstaminal discs subquadrate. **Stamens** free, fused to inner base of corona lobes; anthers 4-locular, ovate, glabrous. **Style head** broadly angularly ovoid. **Follicles** paired, cylindrical-ovoid to ovoid and apiculate. **Seeds** narrowly ovate with tuft of hairs.

Species 4, Africa and Asia; 1 in sthn Afr.: *Tacazzea apiculata* (Oliv.) Venter, Botswana, Namibia and KwaZulu-Natal; in riverine and swamp forest.

Tavaresia Welw. 6880000

(Asclepiadoideae—Ceropegieae)
Welwitsch: 79 (1854); Brown: 901 (1909); White & Sloane: 1103 (1937c); Bullock: 508 (1957); Furtado: 443 (1967); Leach: 349 (1974b).

Decabelone Decne.: 404 (1871); Bullock: 509 (1957).

Spiny, glabrous, usually densely tufted, succulent perennials. **Stems** erect or ascending, 6–12-angled, with angles tuberculate-toothed; each tubercle furnished with 3(1) apical, bristle-like, modified leaves. **Inflorescence** 1 per stem with 1–few flowers produced in succession from near base of stem. **Sepals** ± ovate-lanceolate. **Corolla** with campanulate or elongate-campanulate tube up to 150 mm long and lobes up to 25 mm long, spreading, with small projecting points in sinuses; outside longitudinally flecked and barred with maroon on cream to greenish; inside densely covered with papillae, each tipped with a short seta, with maroon spots on pale yellow coalescing towards base into dark maroon patch around base of gynostegium. **Corona** 2-seriate, arising from staminal column; outer lobes shortly united at base, produced into 10 filiform segments sometimes with knob-like apex, with tooth between pairs at base; inner corona lobes 5, linear, incumbent on back of anthers. **Staminal column** arising from base of corolla. **Anthers** 2-locular, descending towards centre of style head, without apical appendage. **Pollinia** ± horizontal, with short caudicles. **Follicles** erect, fusiform, glabrous, smooth. **Seeds** with tuft of hairs. $x = 11$ (1 report).

Species 2, Africa; 1 in sthn Afr.: *Tavaresia barklyi* (Dyer) N.E.Br. (*T. meintjesii* R.A.Dyer, recorded from Northern Province and Mpumalanga, is thought to be a hybrid), widespread excluding KwaZulu-Natal, Lesotho and Swaziland.

Telosma Coville 6917010

(Asclepiadoideae—Marsdenieae)
Coville: 384 (1905); Brown: 775 (1908).

Prageluria N.E.Br.: 523 (1907); Brown: 776 (1908).

Perennial twiners. **Leaves** petiolate, elliptic or ovate-elliptic. **Flowers** in pedunculate or subsessile, umbel-like cymes which are subaxillary or lateral at nodes. **Sepals** elliptic, membranous, ciliate. **Corolla** with inflated base, then constricted into a neck, densely hairy in mouth and throat; lobes longer than tube. **Corona** of 5 erect, obovate lobes arising from base of staminal column, with a linear process from inner face which is longer than the lobe and projects above style head. **Staminal column** arising from base of corolla. **Anthers** 2-locular, with erect, membranous, ovate appendages reaching style apex. **Pollinia** linear, solitary and erect, with short caudicles. **Style head** pentagonal-ovoid. **Follicles** smooth. **Seeds** crowned with a tuft of hairs. $x = 11$.

Species 10, Africa to Malaya; 1 in sthn Afr.: *Telosma africana* (N.E.Br.) N.E.Br., Northern Province, Mpumalanga to KwaZulu-Natal.

Tenaris E.Mey. 6921000

(Asclepiadoideae—Ceropegieae)
Meyer: 198 (1838); Brown: 795 (1908).

Perennial, slender herbs with small, tuberous rootstock. **Leaves** sessile, linear or filiform. **Flowers** 1–3 together, in sessile or pedunculate fascicles, or in slender racemes or panicles. **Sepals** lanceolate, as long as or longer than corolla tube. **Corolla** with a shortly campanulate tube; lobes much longer than tube, linear, linear-spatulate, or filiform. **Corona** 2-seriate, small, arising from staminal column above its base; outer corona of 5 broadly ovate or subquadrate lobes or of minute pouches; inner corona lobes 5, linear-subulate or filiform, incumbent on backs of anthers. **Staminal column** arising from base of corolla, included in corolla tube. **Anthers** 2-locular, usually without appendages. **Pollinia** ellipsoid, subascending, with short caudicles. **Follicles** erect, somewhat diverging, slender, smooth. **Seeds** crowned with a tuft of hairs.

Species 7, Africa; 4 in sthn Afr., widespread excluding Namibia, Free State and Lesotho.

Tridentea Haw. 6885090

(Asclepiadoideae—Ceropegieae)
Haworth: 34 (1812); Leach: 4 (1978b); Bruyns: 192 (1995).

Dwarf succulents, tufted, forming compact clumps, rarely slightly rhizomatous. **Stems** decumbent, obtusely 4(–6)-angled, softly fleshy, smooth, glabrous to the na-

ked eye, tubercles submammose, each bearing a thick, glabrous, subulate, widely spreading, caducous leaf 1.5–10.0 mm long (leaving a whitish scar), subtended by a patch of stipular hairs on either side sometimes extending along margin. **Inflorescence** glabrous, 1 per stem, arising near base of stem with 1–5 flowers developing in gradual succession on a stout, gradually lengthening peduncle and pedicels (up to 80 mm long), spreading to ascending. **Calyx** 5-lobed, glabrous or with few marginal cilia. **Corolla** rotate to campanulate, usually lobed to ± half of radius or less, 20–100 mm in diameter, with shallow, funnel-shaped depression in centre, outside glabrous, inside glabrous and smooth to slightly rugose or papillate (papillae often with apical cilia), margins usually ciliate. **Corona** 2-seriate, arising from staminal column, glabrous; outer corona of 5 ascending to spreading, dorsiventrally flattened, simple to bifid or trifid lobes, fused only at base to bases of inner lobes; inner lobes incumbent on anthers, usually much exceeding them and rising up above centre of style head, dorsiventrally flattened at least towards base (often cylindrical above), often with laterally flattened, ± deltoid dorsal 'fin' in lower half. **Staminal column** arising near base of corolla tube on short stipe; style head not produced beyond anthers, truncate depressed at apex. **Anthers** 2-locular, incumbent on top of style head, subquadrate, horizontal, without apical or lateral appendages. **Pollinia** nearly horizontal, D-shaped, with short caudicles, corpuscle winged, ± as long as broad. **Follicles** terete-fusiform, slender, mottled with purple, glabrous, smooth. $x = 11$.

Species 8, sthn Afr., Namibia, Botswana, North-West, Free State, Northern, Western and Eastern Cape.

Tromotriche Haw. 6885100

(Asclepiadoideae—Ceropegieae)
Haworth: 36 (1812); Leach: 549 (1984); Bruyns: 198 (1995).

Dwarf, glabrous, tufted succulents, sometimes forming compact clumps, sometimes extensively rhizomatous with widely separated above-ground stems, occasionally with long stems pendulous from cliffs, or creeping. **Stems** 4(–6)-angled, very variable in length, 6–25 mm thick, fleshy, with matt surface, subtessellate, tubercles obscure and obtuse, with small deltoid leaf, subtended by 2 stipular denticles to leafless and without stipules. **Flowers** in groups of 1–5, developing successively on gradually lengthening peduncles randomly situated on stem; pedicel spreading to ascending, glabrous. **Calyx** glabrous. **Corolla** rotate to tubular-campanulate, deeply to shallowly lobed, (12)15–70 mm in diameter, inside often reticulately to transversely rugose, usually with small unicellular papillae, especially in tube. **Corona** 2-seriate, arising from staminal column, glabrous; outer corona of 5 ascending to spreading, dorsiventrally flattened, simple lobes fused to inner lobes at base or fused laterally to lower sides of inner lobes to form cup around column; inner lobes incumbent on anthers, usually much exceeding them and rising up above centre of style head, dorsiventrally flattened at least towards base, mostly with laterally flattened deltoid to clavate dorsal 'fin' in lower half. **Staminal column** arising near base of corolla tube on short stipe; style head not produced beyond anthers, truncate, depressed at apex. **Anthers** 2-locular, horizontal on top of style head, subquadrate, without apical or lateral appendages. **Pollinia** D-shaped, with short caudicles, corpuscle winged, ± as long as broad. **Follicles** terete-fusiform, slender, mottled with purple, glabrous, smooth. $x = 11$ (polyploidy).

Species 11, SW Namibia, Northern, Western and Eastern Cape (winter-rainfall zone).

Tylophora R.Br. 6899000

(Asclepiadoideae—Marsdenieae)
Brown: 17 (1810); Brown: 764 (1908).

Twining or sometimes erect. **Leaves** petiolate, oblong, linear, ovate, or lanceolate. **Flowers** in a pedunculate or sessile, umbel-like cyme, or in clusters scattered along a single-jointed axis, or along branches of a dichotomously branched cyme or panicle, lateral at nodes. **Sepals** ± as long as corolla tube, sometimes with glands within base. **Corolla** 5-lobed to more than halfway; tube saucer-shaped. **Corona** usually of 5 tubercles adnate to or radiating from near base of staminal column, usually not exceeding filaments. **Anthers** 2-locular, tipped by small, membranous appendage; pollinia globose or ellipsoid, suberect, horizontal or pendulous with short caudicles. **Follicles** usually narrowly fusiform, smooth or transversely ridged. **Seeds** ovate, with narrow, marginal wing. $x = 11$ (aneuploids).

Species 50, tropical and subtropical parts of Old World; 10 in sthn Afr., Namibia, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Western Cape as far as Knysna District and Eastern Cape.

Voacanga Thouars 6612000

(Plumerioideae—Tabernaemontaneae)
Thouars:10 (1806): Stapf: 507 (1907); Codd: 273 (1963); Leeuwenberg: 434 (1985).

Annularia Hochst.: 670 (1841). *Cyclostigma* Endl.: 56 (1842); Endlicher: 828 (1844b). *Piptolaena* Harv.: 25 (1842).

Shrubs or trees. **Leaves** opposite, relatively large, shortly petioled, penninerved; leaf bases united into a rim or short sheath; axillary glands present; stipules small, united in an interpetiolar rim or short sheath. **Inflorescence** terminal, frequently paired, corymbose or umbellate, rarely racemose. **Flowers** usually large and showy, white, yellow or greenish- to violet-brown, sometimes unpleasantly scented. **Calyx** tubular or subcampanulate, with a ring or zone of scattered glands within near base, early circumscissile at base and deciduous or more persistent; lobes shorter than tube, obtuse, imbricate. **Corolla** salver-shaped, often fleshy; tube cylindric, constricted below middle and at mouth with callus thickenings round the often very narrow orifices and with prominent filamental ridges within; lobes overlapping to the left, ovate, unequal at base. **Stamens** sessile; anthers 4-locular, adnate by a broad base to corolla tube, ovate-lanceolate, deeply sagittate. **Disc** usually annular, fleshy, surrounding base of ovary or cupular and concealing ovary, rarely reduced to inconspicuous ring. **Ovary** of 2 free or rarely connate carpels; style columnar, thickened upwards, compressed; stigma subcapitate, 5-grooved, with a fleshy, wavy ring or frill at base; ovules many in each locule. **Mericarps** 2, baccate, globose or pear-shaped, with a sticky latex. **Seeds** many, embedded in fleshy pulp, ellipsoid, grooved ventrally; testa grooved or ruminate. $x = 11$.

Species 12, Old World, 7 in Africa; 1 in sthn Afr.: *Voacanga thouarsii* Roem. & Schult. (= *V. dregei* E.Mey.), KwaZulu-Natal and border area of Eastern Cape.

Woodia Schltr. 6790000

(Asclepiadoideae—Asclepiadeae)
Schlechter: 30 (1894a); Brown: 560 (1907).

Perennial herbs with tuberous rootstock, usually single-stemmed, erect. **Leaves** shortly petiolate, penninerved. **Flowers** in sessile or pedunculate umbels, lateral at nodes and terminal. **Sepals** 5, with scales within base. **Corolla** deeply 5-lobed; lobes with revolute margin. **Corona** arising from base of staminal column, of 5

lobes; lobes dorsally flattened, deeply trilobulate; lobules sinulate, ovate-oblong or side lobules linear-oblong and middle one usually curved. **Anthers** 2-locular, with a membranous appendage; pollinia pendulous, ovate or somewhat quadrate; caudicles shorter than pollinia; corpuscle with narrow, membranous wings. **Style head** flat, 5-angled. **Follicles** with short, spine-like processes.

Species 3, sthn Afr., Mpumalanga, KwaZulu-Natal to Eastern Cape.

Wrightia R.Br. 6689000

(Apocynoideae—Wrightieae)
Brown: 762 (1810); Stapf: 508 (1907); Codd: 295 (1963); Leeuwenberg: 480 (1985).

Balfouria R.Br.: 70 (1811). *Anasser* Blanco: 112 (1837) non Juss. (1789). *Piagiaea* Chiov.: 290 (1932). *Walidda* Pichon: 87 (1951). *Scleranthera* Pichon: 88 (1951).

Trees or shrubs. **Leaves** opposite, entire or faintly crenate, shortly petiolate, lanceolate or ovate-lanceolate; stipules 0. **Inflorescence** a terminal or pseudoaxillary cyme. **Flowers** small to rather large, usually scented. **Calyx** divided almost to base, glandular within; sepals imbricate, ovate. **Corolla** ± salver-shaped; tube cylindric, usually short, with variously divided or entire, connate or free appendages in throat (rarely without); lobes longer than tube, overlapping to the left. **Stamens** inserted in mouth of corolla; filaments short, stout, with tuft of hairs at back; anthers 4-locular, conniving in a cone, exserted, lanceolate, acute to acuminate, sagittate, with a small, projecting appendage from foot of connective. **Disc** a narrow rim or 0. **Ovary** of 2 free carpels; style filiform; stigma capitate with small or obscure frill at base and minute, cleft tip. **Mericarps** 2, follicular, cylindric or spindle-shaped, subparallel. **Seeds** cylindric or spindle-shaped, glabrous except for basal tuft of hairs. $x = 11$.

Species 23, Old World, 2 in Africa; 1 in sthn Afr.: *Wrightia natalensis* Stapf, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Xysmalobium R.Br. 6777000

(Asclepiadoideae—Asclepiadeae)
Brown: 27 (1810); Brown: 564 (1907).

Perennial herbs, with tuberous rootstock or fusiform roots; sap milky. **Leaves** often sessile. **Flowers** in umbels; umbels sessile or pedunculate, few to several, lateral at nodes, or a single, terminal umbel. **Sepals** 5, sometimes with scales within sinuses. **Corolla** 5-lobed nearly to base, with lobes erect to reflexed. **Corona** of 5 lobes arising from staminal column; lobes fleshy, ± as thick as broad, sometimes bifid or obscurely 3-lobed, keelless or with one longitudinal median keel on inner face, never cucullate nor complicate nor with process from inner face. **Staminal column** arising from base of corolla. **Anthers** 2-locular, terminated by a membranous, ovate or transversely oblong appendage, rarely spurred at base; pollinia pendulous, caudicles short. **Follicles** smooth or with slender processes. **Seeds** oblong, convex on one side, depressed on reverse, with rim tubercled and with apical tuft of hairs.

Species ± 40, Africa; 21 in sthn Afr., widespread in all countries and provinces, in grassland.

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Aquifoliaceae

(Asteridae—Aquifoliales)

Compiled by R.H. Archer

Trees or shrubs, monoecious, sometimes dioecious, evergreen. **Leaves** alternate, petioled, simple, entire or toothed, glabrous; stipules minute, semipersistent. **Flowers** unisexual, regular, small, in 1–few-flowered, pubescent, axillary cymes. **Calyx** 5- or 6- lobed, imbricate, ciliate. **Corolla** 5- or 6-lobed, imbricate, ciliate, white. **Stamens** 5 or 6, alternating with but basally adhering to petals; anthers 2-thecous with longitudinal dehiscence. **Ovary** superior, 5- or 6-locular, with 1 or 2 pendulous ovules in each locule; stigma sessile, capitate or discoid, prominent. **Fruit** a small globose drupe, ripening pink to crimson, containing 5 or 6 pyrenes. **Seeds**: embryo small, endosperm copious. $x = 10$ (9 or 12, 17, 19) (high polyploidy).

Genera 2; species ± 400, cosmopolitan, but mostly in Asia and tropical America.

Sonder: 472 (1860); Mendes: 353 (1966); Andrews: 163 (1994).

Ilex L. 4614000
Linnaeus:125 (1753); Sonder: 473 (1860); Andrews: 163 (1994).

Description as for family.

Species ± 400, mostly Asia and America, 1 in sthn Afr.: *Ilex mitis* (L.) Radlk. var. *mitis*, widespread in subtropical and temperate forests.

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Araliaceae

(Rosidae—Apiales)

Compiled by C.L. Bredenkamp

Trees, shrubs or herbs, sometimes scandent, sometimes dioecious. **Leaves** alternate, very rarely opposite, usually petioled, sometimes sheathed, simple, digitately lobed or once or twice digitately compound; stipules adnate to petioles. **Flowers** regular, bisexual or unisexual, in heads, umbels, spikes, or racemes, with the racemes panicled or umbellate, rarely flowers solitary; bracts and bracteoles usually present. **Calyx** attached to ovary, annular or shortly cupular. **Petals** usually 5, valvate or slightly imbricate. **Stamens** as many as petals, rarely more; anthers ovate or oblong, 2-thecous. **Disc** epigynous, variable. **Ovary** inferior, 2-locular, with a solitary, pendulous ovule in each locule; styles as many as locules, distinct or connate at base. **Fruit** a berry or drupe, or of 2 readily separable mericarps, sometimes flattened and membranous, oil tubes indistinct or absent. **Seeds** sometimes solitary by abortion.

Genera 59, species ± 800, fairly cosmopolitan, especially well represented in the Malaysian region; sthn Afr.: genera 5, species ± 18, some naturalised.

Sonder: 568 (1862b); Strey: 191 (1973); Burtt & Dickinson: 449 (1975); Strey: 515 (1975); Strey: 66 (1981); Cannon: 621 (1978); Reyneke: 241 (1981); Reyneke: 369 (1984); Reyneke & Kok: 317 (1987); Plunkett, Soltis & Soltis: 565 (1997).

Based on evidence from DNA sequence data (Plunkett, Soltis & Soltis 1997) some genera of the Hydrocotyloideae under Apiaceae (*Centella* and *Hydrocotyle*) have been transferred to the Araliaceae.

Key to genera

1a Perennial herbs or shrublets, erect or prostrate, often rooting at the nodes:
2a Petiole with membranous stipules at the base; furrows between the fruit ribs smooth ..... **Hydrocotyle**
2b Petiole sheathing at base, without stipules; furrows between the fruit ribs wrinkled ..... **Centella**
1b Trees, shrubs or scramblers:
3a Fruit somewhat fleshy; leaves digitately divided or twice divided, sometimes palmatifid:
4a Flowers umbellate, in panicles ..... **Schefflera**
4b Flowers in spikes or racemes ..... **Cussonia**
3b Fruit flattened, membranous, with distinct, longitudinal veins; leaves digitately lobed ..... **Seemannaralia**

Centella L. 5894000
(Hydrocotyloideae)
Linnaeus: 28 (1760); Sonder: 526 (1862a), under *Hydrocotyle*; Schreiber: 1(1967); Adamson: 1 (1951); Burtt: 190 (1991); Pimenov & Leonov: 33 (1993); Schubert & B-E. van Wyk: 301 (1997).

Perennial herbs or shrublets, erect to prostrate, rarely rooting at nodes. **Leaves** simple, petiolate or sessile; blade variously shaped from needle-like to ovate, sometimes cordate. **Flowers** in small, unisexual or bisexual, pendunculate, capitate umbels (umbellules), occasionally solitary; each umbel with a single, bisexual (functionally female) flower surrounded by 4 male flowers, or more often with a single-flowered bisexual umbel and several (1)3–5(7)-flowered male umbels (andromonoecious or androdioecious), rarely all flowers bisexual; bracts 2–4, usually lanceolate. **Calyx** appearing as annular ring. **Petals** valvate, ovate-acute, often with incurved tips. **Disc** ± flat. **Stamens** with anthers ± as long as linear flaments. **Fruit** of 2 laterally compressed mericarps; mericarps smooth or 9–11-ribbed, with ribs usually connected by network of veins; oil ducts indistinct or 0. $x = 9$ (11) (polyploidy, B-chromosomes).

Species ± 50, mostly in the southwestern and eastern parts of sthn Afr., but a few extending to Zimbabwe and Malawi and 1: *Centella asiatica* (L.) Urban, cosmopolitan and pantropical.

Cussonia Thunb. 5872000
Thunberg: 210 (1780); Sonder: 568 (1862b); Strey: 191 (1973); Strey: 515 (1975); Cannon: 621 (1978); Reyneke: 243 (1981); Reyneke: 369 (1984); Reyneke & Kok: 317 (1987).

Trees or shrubs. **Leaves** often crowded at ends of branches, palmatifid, or digitately divided, or twice digitately divided, petioled; leaflets entire to variously divided; stipules adnate to petiole. **Flowers** in dense spikes or racemes. **Calyx** 5-toothed or subentire; tube subcylindric to obsolete above ovary. **Petals** 5, often somewhat fleshy, valvate. **Stamens** 5; filaments often fleshy; anthers ovate, subequal to filaments. **Disc** flat, depressed or conical in middle. **Ovary** 2-locular; styles 2, short or elongated, often thick and stigmatose on inner face. **Fruit** fleshy, laterally compressed or subglobose. **Seeds** globose to oblong and planoconvex in cross-section.

Species 25, tropical to sthn Afr. and Mascarene Islands; ± 10 in sthn Afr., Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

Hydrocotyle L. 5893000
(Hydrocotyloideae)
Linnaeus: 234 (1753); Sonder: 526 (1862a), in part; Schreiber: 1 (1967); Eichler: 1 (1987); Burtt: 215 (1991); Pimenov & Leonov: 62 (1993).

Prostrate, perennial herbs in damp places, often rooting at nodes and matted. **Leaves** simple, blade often peltate, deeply cordate or divided nearly to base into 3, 5 or more segments, petioled; cauline leaves stipulate. **Flowers** bisexual, usually in small, simple or branched, pedunculate umbels, rarely in cymes; bracts obsolete or 0.

Calyx appearing as annular ring. **Petals** valvate, ovate, acute, often with incurved tips. **Disc** ± flat. **Stamens** with linear filaments; anthers ± as long as filaments; subdidynamous. **Fruit** lenticular, laterally compressed, orbicular or somewhat depressed, smooth or rugose, of 2 5-ribbed mericarps; oil ducts indistinct or 0. **Seeds** lenticular. $x = 9$, 8 or 12 (10, 11) (high polyploidy).

Species ± 130, more or less cosmopolitan; 3 in sthn Afr. and 2 other naturalised, fairly widespread.

Schefflera J.R.Forst. & G.Forst. 5852000

Forster & Forster: 45, t. 23 (1776) name conserved; Cannon: 622 (1978).

Heptapleurum Gaertn.: 472, t. 178, fig. 3 (1791); Hiern: 29 (1877).

Trees, shrubs, or scramblers. **Leaves** digitately compound or sometimes simple; leaflets entire or serrulate; stipules connate with petiole. **Flowers** in panicles or racemes of small umbels; bracts 0 or minute. **Calyx** 5-toothed or rim-like. **Petals** 5, valvate. **Stamens** 5; anthers ovate to ovoid. **Disc** with undulate margin. **Ovary** 2-locular; styles 2, free or stigmas subsessile and papilla-like. **Fruit** a small, subglobose, 2-locular berry. $x = 12$ (polyploidy).

Species 200, Africa to Madagascar, Far East and New Zealand; 1 in sthn Afr.: *Schefflera umbellifera* (Sond.) Baill., Northern Province, Mpumalanga, Swaziland to KwaZulu-Natal and Eastern Cape border.

Seemannaralia R.Vig. 5872010

Viguier: 116 (1906); Burtt & Dickinson: 449 (1975).

Tree or large shrub. **Leaves** simple, digitately lobed and veined, toothed, petiolate; stipules adnate to petiole. **Flowers** in axillary and terminal panicles of umbels. **Calyx** indistinctly 5-toothed; tube saucer-shaped. **Petals** 5, slightly imbricate. **Stamens** 5; anthers ± as long as filaments, ovate, sagittate. **Ovary** 2-locular; styles thick, somewhat cohering. **Fruit** flattened, elliptic with lateral veins. **Seeds** solitary by abortion, discoid.

Species 1: *Seemannaralia gerrardii* (Seem.) R.Vig.; Northern Province and Mpumalanga to KwaZulu-Natal and Eastern Cape border area.

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*Aristolochiaceae

(Magnoliidae—Aristolochiales)

Compiled by M. Jordaan

Erect, twining or scrambling perennial herbs or shrubs, often with prostrate or tuberous rhizomes or rootstocks. **Leaves** alternate, entire or 2–7-lobed, cordate, 3–7-nerved, petiolate, conduplicate in bud; stipules 0 but an axillary bud often producing a clasping, broadly reniform leaf (pseudostipule). **Flowers** bisexual, irregular, epigynous, solitary or in fascicles, axillary, with or without bracts. **Perianth** simple, fused to form a straight, curved, or S-shaped, coloured tube, inflated at basal part (utricle), then contracted or narrowed above in a cylindrical to funnel-shaped part (tube), gradually elongated, enlarged and expanded into the 1-lipped or (1–6)-lobed limb, often with dark reddish or brownish colour and foetid smell; inside of utricle often provided with 2(–6) glandular bodies. **Stamens** usually 6 or more; filaments scarcely distinguishable from column; anthers sessile and adnate to style column in a gynostemium, 4-celled, dehiscing longitudinally. **Ovary** inferior, 3–6-carpellate, oblong or elongate, slightly 6-angular and 5- or 6-locular; placentation axile; ovules many, anatropous; styles 3, 5 or 6, marginally connate, fleshy, with coroniform to subcapitate stigmatic lobes. **Fruit** a capsule, septicidally dehiscent, with 6 valves or splitting through placentas, obovoid to short-cylindrical. **Seeds** usually many, ovate, deltoid or triangular, compressed, mostly winged all round or thick with an elaiosome; testa crustaceous or hard, finely verrucose or smooth; embryo well developed but minute; endosperm abundant, oily, starch-free. $x = 7$ (4, 5, 6, 8, 13) (polyploidy).

Genera ± 12, with 450–500 species, with a pantropical, an Indomalayan, and a holarctic branch; sthn Afr.: genus 1, species 2 (introduced).

Jussieu: 72 (1789); Endlicher: 344 (1837); Duchartre: 421 (1864); Bentham: 121 (1880); Solereder: 264 (1889); Schmidt: 201 (1935); Hubcr: 277 (1985); Hubcr: 129 (1993).

*Aristolochia L. 2174000

Linnaeus: 960 (1753); Linnaeus: 410 (1754); Adanson: 71 (1763); Jussieu: 72 (1789); Willdenow: 151 (1805); Brown: 349 (1810); Endlicher: 345 (1837); Duchartre: 421 (1864); Bentham: 123 (1880); Solereder: 272 (1889); Baker & Wright: 135 (1909); Burtt Davy: 115 (1926); Schmidt: 235 (1935); Davis & Khan: 515 (1961); Ball: 73 (1964); Davis & Khan: 552 (1982); Verdcourt: 4 (1986); Huber: 137 (1993).

Description as for family.

Species ± 120, ranging from Europe (mainly Mediterranean) and tropical Africa, including Madagascar, through warm-temperate and tropical Asia to Japan, the Philippines, New Guinea, the Solomon Islands, and North Australia; 2 introduced to sthn Afr.: **Aristolochia elegans* Mast., Dutchman's Pipe, a native of Paraguay, North Argentina and Brazil occurs as an escape in the Northern Province, Mpumalanga and KwaZulu-Natal and **A. albida* Duch., reported as an escape in Namibia.

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Asteraceae (Compositae)

(Asteridae—Asterales)

Compiled by P.P.J. Herman, E. Retief, M. Koekemoer and W.G. Welman

Annual, biennial or perennial herbs, subshrubs, shrubs, occasionally scramblers or lianes, sometimes trees, rarely aquatic or epiphytic, sometimes succulent, sometimes spinescent, rarely monoecious or dioecious; typically with resin ducts or latex canals (tribe Lactuceae). **Leaves** alternate or opposite, sometimes whorled, or radical and rosulate, sessile or petiolate, usually simple, entire or toothed, lobed or variously dissected, glabrous or pubescent and/or glandular; stipules 0 but stipuliform appendages sometimes present. **Inflorescence** a capitulum (or head) with 1–many individual flowers (florets) ± sessile and aggregated on a common receptacle and surrounded by an involucre of 1–many rows of bracts, often resembling a single flower; capitula solitary and terminal on scapes or leafy stems, or few to very many in lax or ± clustered corymbose or paniculate synflorescences, sometimes cymose, spicate, racemose or aggregated into secondary capitula or glomerules. **Receptacle** flat, hemispherical or conical, with scales or setae subtending florets (paleate), or epaleate and surface smooth, areolate or shallowly to deeply honeycombed (alveolate); alveolae often fimbriate or setose. **Involucral bracts** (phyllaries) in 2–many rows, free and imbricate or ± connate, or sometimes in 1 row and united or with cohering overlapping margins, persistent or rarely caducous, occasionally accrescent, sometimes apically appendaged; thickened region in lower part of bracts referred to as stereome; sometimes additional outer row of smaller bracts (calyculus) present (e.g. in *Senecio*). **Florets** epigynous, small, 1–500 or more per capitulum, bisexual, unisexual or sterile, regular or irregular. Two types of regular florets (no.1 and no. 2): (1) **disc** or **central florets**: tubular, with (3)4 or 5 apical lobes, bisexual, or functionally male or unisexual; (2) **tubular-filiform (outer) florets**: tube slender (anthers absent) with 2 or 3 small apical lobes, female. Four main types of irregular florets (nos 3–6): (3) **bilabiate disc florets**: ± tubular below, bilabiate above, with 3 outer and 2 inner lobes, mostly bisexual, rarely functionally male or female, situated on disc/central part of capitulum; (4) **bilabiate ray florets**: ± tubular below, bilabiate above with 2 small inner lobes and a 3-lobed, short to long, strap-shaped lamina, mostly female, rarely bisexual, situated on periphery of capitulum; (5) **true ray florets**: lamina strap-shaped with 3(4) apical lobes, inner lobes absent, usually female or neuter; (6) **ligulate florets** (ligules): lamina strap-shaped with 5 apical lobes, mostly bisexual (tribe Lactuceae), rarely female or male. (Note: all florets on the periphery of the receptacle, regardless of their morphology, are often referred to as marginal, outer or female florets, those occurring on the receptacle/disc, as disc or central florets). **Capitula** may be grouped into two broad categories: **heterogamous capitula** containing florets with different sex arrangements (e.g. female and bisexual); **homogamous capitula** containing florets with similar sex arrangements (mostly either bisexual or unisexual). Further groupings are as follows: **Radiate capitula** are usually heterogamous, containing bilabiate ray florets (no. 4) or true ray florets (no. 5) on periphery (mostly in 1 row) and central disc florets (no. 1) or bilabiate disc florets (no. 3). **Disciform capitula** are usually heterogamous with at least two types of nonradiating florets, usually tubular-filiform outer florets (no. 2), in 1 or more rows, and central disc florets (no. 1). **Discoid capitula** are usually homogamous containing only disc florets (no. 1). **Ligulate capitula** are homogamous, containing only ligulate florets (no. 6), as in the tribe Lactuceae. Whether capitula are heterogamous or homogamous can be deduced from the description of the florets. **Calyx**, if present, represented by a pappus consisting of persistent or caducous, 1–many-seriate hairs, bristles, awns or scales, or pappus elements ± fused to form annular or ± cup-shaped or ear-shaped corona borne apically on ovary/fruit; pappus setae scabrid, barbellate or ± plumose. **Corolla** usually gamopetalous, of (3–)5 ± united petals, rarely 0. **Stamens** (3–)5; filaments free, arising on corolla tube, contractile; anthers introrse, usually apically appendaged, usually laterally connate into a cylinder around style, thecae rounded, sagittate (tailed/caudate) and/or calcarate at base; pollen usually echi-

nate, sometimes echinolophate or lophate. **Style** of bisexual or functionally male florets elongating within anther tube, shallowly to deeply bifid, occasionally undivided in functionally male florets; style branches with stigmatic areas on inner sides, apex acute, rounded or truncate, or branches produced beyond stigmatic surfaces as triangular, subulate or clavate appendages, variously papillate or hairy, usually with brush of collecting hairs that sweep pollen from anther tube; style of female florets simpler, with acute to rounded style branches and without sweeping hairs. **Ovary** inferior, of 2 united carpels, unilocular with 1 erect basal ovule. **Fruit** unilocular, 1-seeded, indehiscent (a cypsela/achene), very rarely fleshy with single seed enclosed in hard endocarp (drupe) (*Chrysanthemoides*), sometimes produced apically into a beak (rostrum), crowned by persistent or caducous pappus, or epappose; endosperm 0 or vestigial.

Genera ± 1535 and 25000 species; cosmopolitan, absent only from Antarctica; sthn Afr.: 246 genera, 2305 species.

Asteraceae Dumort.: 55 (1822) alternative name; Merxmüller: 1 (1967a); Bremer: 13 (1994).

Compositae Giseke: 538 (1792) name conserved; Harvey: 44 (1865); Hilliard: 1 (1977); Pope: 1 (1992).

Cichoriaceae Juss., Merxmüller: 1 (1967b).

Key to the tribes after Anderberg (1989), Keeley and Jansen (1991), Jeffrey & Pope: 2 (1992), Karis: 197 (1992) and Robinson: 199 (1992). In the key to tribes the Helenieae key out twice together with the Heliantheae. The main difference between these two tribes is the presence (Heliantheae) or absence (Helenieae) of receptacular paleae. The insufficiently known genus *Cypselodontia* DC. was not considered in the compilation of the keys.

Key to tribes and to *Corymbium* (not assigned to a tribe)

1a Plants monocotyledonous in appearance; capitula discoid, 1-flowered; upper involucral bracts sheathing flower ..... **Corymbium**

1b Plants not exhibiting the above characters in combination:

2a Corollas all strap-shaped, equally 5-toothed at the apex (florets ligulate – no. 6); latex present in plant ..... **Lactuceae** (p. 115)

2b Corollas not strap-shaped, if radiate, then these with 4 or fewer equal or unequal apical teeth; latex rarely present:

3a Style branches with sweeping hairs consisting of 2 or 3 cells separated by vertical walls; endothecial cells with transverse thickenings in only basal half; lobes of disc florets with accessory apical vein ..... **Eremothamneae** (p. 109)

3b Sweeping hairs, endothecial cells and lobes of disc florets not as above:

4a Style branches with conspicuous papillose appendages; capitula discoid, with florets all bisexual, not yellow; corollas with 5(4) relatively short, broad apical lobes; mature cypselas black[1] ..... **Eupatorieae** (p. 109)

4b Style branches, capitula, corollas and mature cypselas not showing the above combination of character states:

5a Involucral bracts uniseriate, cohering by their overlapping margins, or partly or wholly connate, with or without a calyculus; pappus present:

6a Involucral bracts with evident elongated oil glands; cypselas black[1] when mature ..... **Helenieae** (p. 113)

6b Involucral bracts without elongated oil glands; cypselas not black[1] when mature ..... **Senecioneae** (p. 117)

5b Involucral bracts imbricate, in 2 or more rows, free or connate; OR uniseriate but then bracts not cohering or pappus 0 or capitula unisexual or cypselas densely villous with long hairs from base:

7a Style branches long, gradually attenuate-acute, shortly hairy on outside, style shaft similarly hairy on upper part; capitula homogamous, all florets bisexual ..... **Vernonieae** (p. 119)

7b Styles and capitula not exhibiting above combination of character states, or capitula unisexual:

8a Capitula with all or only outer florets bilabiate; corollas with 3-toothed outer lips and 2-lobed inner lips..... ..... **Mutisieae** (p. 116)

8b Capitula without any such bilabiate florets:

9a Capitula discoid; involucral bracts without scarious unlobed appendages or apices, and without scarious margins; OR capitula radiant (capitula discoid but outer florets ± enlarged and sterile, not true ray flowers); OR capitula unisexual and plants dioecious; appendages of involucral bracts, if present, spiniform and/or pinnately divided:

10a Leaves spiny or bristly spiny at least towards base:

11a Anthers tailed (caudate); receptacle densely setose ..... ***Cardueae** (p. 108)

11b Anthers not tailed (ecaudate); receptacle alveolate with fringed alveolae ..... **Arctoteae** (p. 105)

10b Leaves neither spiny nor bristly spiny:

12a Corolla lobes of tubular florets much longer than broad; leaves alternate; capitula of more than 1 floret, not aggregated into glomerules:

13a Receptacle densely setose; inner florets bisexual, outer sterile ..... ***Cardueae** (p. 108)

13b Receptacle naked, not setose; all florets unisexual; plants dioecious..... **Tarchonantheae** (p. 118)

12b Corolla lobes ± as long as broad, or if much longer than broad then leaves opposite; capitula sometimes of only 1 floret, or capitula aggregated into glomerules ..... go to couplet 14

9b Capitula radiate or disciform but not radiant as above; OR capitula discoid and involucral bracts with unlobed, scarious, often white or coloured appendages or apices or with scarious, usually brownish margins, but not with spiniform and/or pinnately divided appendages; OR capitula unisexual and plants monoecious:

14a Style branches of disc florets connate in lower part, connate part thicker than style shaft and abruptly marked off from it by ring of short hairs at its base; capitula always bisexual ..... **Arctoteae** (p. 105)

14b Style branches of disc florets long to short or 0 but connate lower part of style branches, if present, not as above or capitula unisexual and plants monoecious:

15a Receptacle paleate and leaves opposite, or leaves not opposite and mature cypselas black[1] and/or capitula glomerulate; OR receptacle epaleate and pappus of scales and/or leaves opposite and/or mature cypselas black and/or capitula unisexual and/or capitula glomerulate; pappus not of slender bristles, or if of bristles then bristles plumose..... **Heliantheae** (p. 113) and **Helenieae** (p. 113)

15b Receptacle epaleate (although sometimes hairy or fimbrillate); OR receptacle paleate and leaves not opposite (although sometimes opposite on upper stem) and cypselas not black[1] when mature,

or capitula not unisexual; capitula glomerulate or not; OR if lower leaves opposite then pappus of slender barbellate bristles, at least in disc florets, or pappus 0, receptacle naked and capitula not glomerulate:

16a Style branches of bisexual or functionally male florets each with a subulate to triangular papillose appendage:

17a Receptacle alveolate; pappus a deeply and unequally laciniate corona; capitula disciform... ..... **Heliantheae** (p. 113) and **Helenieae** (p. 113)

17b Receptacle, pappus and capitula not showing the above combination of character states..... ..... **Astereae** (p. 106)

16b Style branches of bisexual or functionally male florets acute to rounded, or truncate and fringed with short hairs or papillae, or shortly conical at apex with subdistal fringe of hairs, not appendaged; or style undivided:

18a Involucral bracts with scarious, usually brown, often erose margins, not appendaged; leaves often pinnatipartite; style branches apically truncate and fringed, or style undivided and truncate; pappus 0, or if present, then a short lacerate crown or lobed auricle, or leaves pinnatipartite and outer pappus of 5 white petaloid scales ..... **Anthemideae** (p. 103)

18b Involucral bracts green and herbaceous (though often with hyaline margins), or with scarious, membranous, often white or coloured appendages or apices, or rarely appendages foliose; leaves never pinnatipartite; a pappus of hairs or scales present in at least some florets, or if 0 then style branches not truncate and fringed:

19a Pappus 0; fruit large, curved, angular or winged cypselas, or smooth drupes; capitula radiate..... **Calenduleae** (p. 108)

19b Pappus present or 0; fruit small cypselas and not as above; capitula radiate or disciform:

20a Capitula radiate; ray florets neuter, or if fertile then style branches shortly conical at apex with subdistal fringe of hairs ..... **Mutisieae** (p. 116)

20b Capitula radiate, disciform or discoid; ray florets, if present, female; style branches not as above:

21a Stems without resin ducts; leaves generally entire, with hairs of type B (hairs with 1 basal cell and a very long terminal cell); involucral bracts with entire or divided sclerenchymatous basal portion; pollen with 2-layered double sexine..... ..... **Gnaphalieae** (p. 110)

21b Stems with or without resin ducts; leaves dentate, denticulate, serrulate or pinnatifid, rarely entire, with hairs of type A (multiseptate hairs with short cells); involucral bracts with undivided sclerenchymatous portion; pollen with 1-layered sexine:

22a Female florets in 1 row, radiate, miniradiate, rarely filiform, or absent; style with acute sweeping hairs ending above furcation, rarely with obtuse sweeping hairs (*Anisopappus*) ..... **Inuleae** (p. 115)

22b Female florets in several rows, filiform or rarely radiate; style with obtuse sweeping hairs..... **Plucheeae** (p. 117)

[1] consider cypselas to be black if the body of the mature cypsela is shiny-black, at least in part; paler striations, ribs or wings may be present.

Tribe **Anthemideae**

Annual or perennial herbs, subshrubs or shrubs, rarely spinescent, usually aromatic. **Leaves** alternate or rarely opposite or fasciculate or rosulate, generally variously dissected, pinnatisect, pinnatifid, lobed or serrate-dentate or rarely entire, rarely succulent. **Capitula** radiate, disciform or discoid, solitary, corymbose or paniculate, rarely aggregated, often pedunculate, sometimes sessile. **Involucral bracts** in 3 or more rows, rarely in 1 or 2 rows, imbricate, almost always with scarious margins and apex. **Receptacle** paleate or epaleate, rarely pilose or hirsute. **Ray florets** (in radiate capitula) female, fertile or sterile or neuter, lamina white, yellow or rarely blue-violet, pink, cream-coloured or reddish. **Outer florets** (in disciform capitula) female, in 1 or more rows, tubular or filiform, rarely without corollas. **Disc florets** bisexual or functionally male, yellow or rarely whitish or red, sometimes distinctly divided into tube and limb, sometimes more funnel-shaped, rarely somewhat irregular, basally often swollen and saccate in fruit; 5- or 4-lobed, rarely 3-lobed. **Anthers** mostly ecalcarate and ecaudate, rarely shortly caudate or calcarate; apical appendage ovate to lanceolate-oblong, flat, sometimes with resin sacs; endothecial tissue generally radial or rarely polarised. **Style branches** almost always truncate and penicillate, hairs obtuse, with stigmatic areas in 2 marginal stripes, sometimes undivided in functionally staminate florets. **Cypselas** generally terete to weakly angled or ribbed or flattened, sometimes winged, thin- or thickwalled. **Pappus** generally of rather few scarious scales, corona or auricle, often 0.

Genera 109, worldwide but with main concentrations in Central Asia, Mediterranean region, sthn Afr., less often North America, rarely South America and Australia; 34 genera and 293 species in sthn Afr.

Cassini: 192 (1819a); Bremer & Humphries: 90 (1993); Bremer: 447 (1994).

Key to the genera of the tribe Anthemideae after Bremer & Humphries: 84 (1993).

Key to genera

1a Receptacle distinctly paleate with paleae subtending florets:

2a Capitula radiate:

3a Rays yellow, rarely abaxially reddish:

4a Involucral bracts in 5–7 rows ..... **Ursinia**

4b Involucral bracts in 1 row..... **Eriocephalus**

3b Rays white or rarely pink to reddish on both sides:
5a Pappus of 5 (rarely 8–10) large obovate scales and sometimes 5 additional subulate scales ..... **Ursinia**
5b Pappus a shallow corona, an auricle or of small scales or 0:
6a Cypselas copiously villous:
7a Involucral bracts in 2–4 rows ..... **Lasiospermum**
7b Involucral bracts in 1 row ..... **Eriocephalus**
6b Cypselas glabrous, sometimes glandular or papillose:
8a Shrubs with opposite leaves (leaves alternate in *Eumorphia davyi*); cypselas with 10 or more ribs ..... **Eumorphia**
8b Herbs or rarely shrubs with alternate leaves (rarely with some leaves opposite basally on stem); cypselas various:
9a Cypselas dorsiventrally flattened and with 2 lateral ribs but no wings ..... ***Achillea**
9b Cypselas various, sometimes dorsiventrally flattened but then rhombic in cross-section and without 2 lateral ribs and not or only narrowly winged:
10a Leaves serrate-dentate, rarely pinnatifid or entire; anthers caudate ..... **Osmitopsis**
10b Leaves pinnatisect to variously lobed; anthers not caudate ..... ***Anthemis**
2b Capitula discoid or disciform:
11a Pappus present, of scales, an auricle or a corona:
12a Pappus of 5 (rarely 8–10) large obovate scales and sometimes 5 additional subulate scales ..... **Ursinia**
12b Pappus a shallow corona, an auricle or of small scales:
13a Capitula narrowly oblong-obconical, slender and few-flowered; indumentum of stellate hairs ..... **Hymenolepis**
13b Capitula rather widely urceolate to cyathiform-campanulate; indumentum of simple or bifid hairs ..... **Inulanthera**
11b Pappus 0 but cypselas sometimes apically with obtuse rim (rarely with pseudopappus of bristle-like stalked glands in *Athanasia*):
14a Cypselas glabrous, sometimes glandular ..... **Athanasia**
14b Cypselas copiously villous:
15a Involucral bracts in 2–4 rows ..... **Lasiospermum**
15b Involucral bracts in 1 row ..... **Eriocephalus**
1b Receptacle completely epaleate (though sometimes pilose or hirsute) or capitula few-flowered and presence of paleae unclear:
16a Capitula radiate:
17a Rays yellow, rarely partly white or reddish or abaxially reddish:
18a Pappus present in ray or disc cypselas or generally in all cypselas, of scales, an auricle or a corona:
19a Cypselas dorsiventrally flattened and with 2 lateral broad wings, annual herbs with entire, fleshy leaves ..... **Adenoglossa**
19b Cypselas oblong, 4-angled, perennial herbs, leaves not fleshy ..... **Inezia**
18b Pappus 0 but cypselas sometimes apically with obtuse rim:
20a Ray cypselas triquetrous, winged; disc cypselas prismatic with narrow adaxial wing or terete and apparently ribbed ..... ***Chrysanthemum**
20b Cypselas all equal, oblong or obovoid, without wings or dorsiventrally flattened and laterally winged:
21a Disc corolla 4-lobed; rays not true ray florets but outer disc florets with 1 corolla lobe expanded to a limb; cypselas dorsiventrally flattened ..... **Cotula**
21b Disc corolla 5-lobed; rays true ray florets with apically 3-lobed laminas; cypselas oblong or obovoid, ribbed. ..... ***Leucanthemum**
17b Rays white, rarely pink to reddish, bluish violet or creamy orange, but not yellow:
22a Pappus present at least in ray cypselas, of scales, an auricle or a corona (sometimes almost absent in *Tanacetum* but cypselas then apically with acute rim):
23a Annual herbs ..... **Foveolina**
23b More or less suffruticose perennials, shrublets or shrubs:
24a More or less suffruticose perennials ..... ***Tanacetum**
24b Woody shrubs or shrublets:
25a Cypselas dorsiventrally flattened and laterally winged ..... **Leucoptera**
25b Cypselas ± terete, not winged ..... **Cymbopappus**
22b Pappus 0 but cypselas sometimes apically with obtuse rim (mainly abaxial and somewhat toothed in *Oncosiphon*):
26a Disc corolla 4-lobed:
27a Leaves entire, lanceolate to linear ..... **Thaminophyllum**
27b Leaves variously lobed or pinnatisect, not entire:
28a Disc corolla tube very much swollen and brittle ..... **Oncosiphon**
28b Disc corolla tube not or only slightly swollen:
29a Leaves with few, oblong to rounded, apically mucronate lobes; receptacle pilose ..... **Lidbeckia**
29b Leaves variously pinnatisect; receptacle glabrous:
30a Shrubs; cypselas subglobose with 2 or 3 adaxial faint ribs ..... **Hilliardia**
30b Herbs; cypselas dorsiventrally flattened:
31a Rays not true ray florets but outer disc florets with 1 corolla lobe expanded to a limb, ray florets and cypselas stalked ..... **Cotula**
31b Rays true ray florets with apically 3-lobed or entire lamina, ray florets and cypselas sessile ..... **Inezia**

26b Disc corolla 5-lobed:
32a Leaves opposite ..... **Eumorphia**
32b Leaves alternate:
33a Disc corolla tube confluent with cypsela; cypsela ribs with resin ducts; leaves serrate ..... **Adenanthellum**
33b Disc corolla tube not confluent with cypsela; cypsela ribs without resin ducts; leaves entire or few-lobed... ..... **Phymaspermum**
16b Capitula discoid or disciform:
34a Pappus present, of scales, an auricle or a corona:
35a Annual herbs:
36a Cypsela wall and pappus white and spongy, abaxially thin ..... **Foveolina**
36b Cypsela wall not white and spongy; with 1 adaxial and 2 lateral ± thick ribs; pappus a stiff corona covered with myxogenic cells ..... **Myxopappus**
35b Perennial herbs or often subshrubs, shrublets or shrubs:
37a Capitula closely aggregated at stems; leaves small, ericoid, entire or occasionally few-lobed; pappus of 7–10 oblong, adaxially longer scales ..... **Marasmodes**
37b Capitula solitary or laxly to densely corymbose; leaves and pappus various:
38a Capitula narrowly oblong-obconical, slender and few-flowered; pubescent shrubs; indumentum of stellate hairs ..... **Hymenolepis**
38b Capitula generally urceolate to cyathiform or campanulate; habit various; indumentum if present of simple or bifid hairs:
39a Shrubs with corymbose capitula and pinnatisect leaves; cypselas 8–10-ribbed; pappus of small scales projecting from cypsela ribs ..... **Inulanthera**
39b Shrubs with ± ericoid leaves; pappus of scales not distinctly projecting from cypsela ribs, a corona or an auricle ..... **Pentzia**
34b Pappus 0 but cypselas sometimes apically with obtuse rim (mainly abaxial and somewhat toothed in *Oncosiphon*; rarely with pseudopappus of bristle-like stalked glands in *Athanasia*):
40a Leaves opposite; shrubs with sessile or corymbose capitula:
41a Leaves entire; capitula sessile ..... **Athanasia**
41b Leaves pinnatifid; capitula corymbose ..... **Gymnopentzia**
40b Leaves alternate, rarely opposite but then habit or capitula different:
42a Capitula in elongated and paniculate, rarely racemiform or spiciform synflorescences, often small and many.... ..... **Artemisia**
42b Capitula solitary or in lax to dense corymbs, small to medium-sized:
43a Central floret corolla 4-lobed (rarely 3-lobed in *Cotula*):
44a Cypselas dorsiventrally flattened with 2 lateral ± distinct ribs or wings:
45a Shrublets or subshrubs with corymbose or occasionally solitary capitula ..... **Schistostephium**
45b Annual or perennial herbs with solitary capitula, rarely few together:
46a Capitula sessile; outer female florets without corolla and with style persistent and spinescent in fruit.. ..... ***Soliva**
46b Capitula ± pedunculate; outer female florets with corolla; style not persistent ..... **Cotula**
44b Cypselas not or only slightly dorsiventrally flattened without or with 3–5 ribs and no wings:
47a Disc corolla tube very much swollen and brittle ..... **Oncosiphon**
47b Disc corolla tube not or only slightly swollen; cypsela wall either white and spongy with 1 adaxial and 2 lateral weak ribs, abaxially thin or cypselas almost terete and thin-walled all around ..... **Foveolina**
43b Central floret corolla 5-lobed:
48a Annual herbs ..... **Foveolina**
48b Perennial herbs or often subshrubs, shrublets or shrubs:
49a Cypselas dorsiventrally flattened, with or without lateral wings ..... **Hippia**
49b Cypselas not dorsiventrally flattened, not winged:
50a Cypsela ribs acute, with secretory cavities; corolla gradually expanded and funnel-shaped ..... **Athanasia**
50b Cypselas without ribs or ribs faint or rounded, without secretory cavities; corolla ± distinctly divided into tube and limb:
51a Cypselas 10–18-ribbed ..... **Phymaspermum**
51b Cypselas with 0 or fewer than 10 ribs:
52a Corolla lobes cucullate, anthers shortly calcarate, involucral bracts in 3(4) rows, inner row smaller than outer 2 and membranous ..... **Rennera**
52b Corolla lobes not cucullate, anthers ecalcarate; involucral bracts in 3–5 rows ..... **Pentzia**

Tribe **Arctoteae**

Herbs, subshrubs or shrubs; latex sometimes present. **Leaves** alternate, rosulate, rarely opposite, entire or frequently dentate-pinnatisect to lobed, often spiny or spinulose or unarmed. **Capitula** generally radiate or discoid, rarely disciform; solitary or corymbose, rarely in racemiform synflorescences or aggregated to secondary heads. **Involucral bracts** imbricate in several rows, often with scarious appendages or spine-tipped; free or ± connate. **Receptacle** areolate-alveolate, sometimes deeply alveolate with enclosed cypselas, rarely almost smooth, naked or often with denticulate to bristly pit margins. **Ray florets** female, fertile, sterile or neuter, often with staminodes; with long radiate and yellow or variously coloured lamina, apically 3- or 4-lobed. **Disc florets** bisexual or sometimes functionally

male, regular and rather shallowly to deeply 5-lobed; yellow or sometimes variously dark-coloured, frequently with stalked glands. **Anthers** calcarate, mostly ecaudate or shortly caudate; apical appendage elongate and obtuse-rounded to broadly ovate-triangular and distinctly demarcated from thecae; endothecial tissue polarised or radial; filaments smooth or rarely papillose. **Style** slender or with much thickened apical part, bilobed or with short to long style branches, mostly with ring of longer hairs beneath style branches or at base of apical part; hairs acute. **Cypselas** ellipsoid-oblong to obovoid-obconical, frequently distinctly ribbed, often sericeous-villous with twin hairs or glabrous. **Pappus** of scales or 0.

Genera 16, Africa, mainly sthn Afr., also in SW Asia and Australia; 14 genera and 198 species in sthn Afr.

Cassini: 159 (1819a); Pope: 229 (1992); Bremer: 256 (1994).

Key after Dyer: 659 (1975) and Hilliard: 529 (1977).

Key to genera

1a Capitula discoid, massed in a cushion covering the crown of the root and surrounded by a rosette of leaves ..... **Platycarpha**
1b Capitula radiate, if discoid, then not massed in a cushion surrounded by leaves:
2a Involucral bracts ± free, the inner ones at least obtuse, scarious at the tips and on the margins:
3a Pappus with subplumose bristles ..... **Heterolepis**
3b Pappus 0 or of scales:
4a Ray florets sterile, not producing cypselas; pappus 0 or of small scales ..... **Arctotheca**
4b Ray florets female, producing cypselas:
5a Acaulescent herbs:
6a Cypselas flat and deeply grooved on one face, convex and tubercled on the other ..... **Arctotis**
6b Cypselas turbinate ..... **Haplocarpha**
5b Stems diffuse or matted:
7a Stems forming dense mats; pappus of two rings of short, ovate-acuminate, laciniate scales ..... **Dymondia**
7b Stems diffusely branched; pappus 0 or of 1 or 2 rows of larger or small scales ..... **Arctotis**
2b Involucral bracts connate at base or higher, acute or acuminate, often spine-tipped:
8a Pappus 0; shrublets; branches slender, densely leafy up to the capitula ..... **Cullumia**
8b Pappus present:
9a Receptacle with outer honeycomb-cavities thick-walled, inner ones membranous; pappus scales ciliate to fimbriate:
10a Involucre bracts in 3 rows, the middle ones the largest; receptacle not breaking up at maturity ..... **Heterorhachis**
10b Involucre bracts in 2 rows, outer ovate, inner slender; receptacle breaking up at maturity ..... **Didelta**
9a Receptacle uniformally honeycombed:
11a Annual herbs, sometimes wiry; seeds germinating from within old capitula:
12a Disc florets with only a few fertile; pappus short, coroniform, hidden by hairs of cypselas ..... **Gorteria**
12b Disc florets bisexual, all fertile; pappus scales linear ..... **Cuspidia**
11b Perennial herbs, subshrubs or shrubs, rarely annuals; seeds not germinating within capitula; pappus biseriate:
13a Involucre bracts slightly fused at base, pungent-toothed or -lobed ..... **Berkheya**
13b Involucre bracts fused in the lower half, sometimes setose, not spinescent:
14a Pappus scales of outer whorl not overlapping, the inner ones equal or somewhat longer; sap milky ..... **Gazania**
14b Pappus scales of outer whorl spirally overlapping, inner whorl small or obsolete ..... **Hirpicium**

Tribe **Astereae**

Herbs, subshrubs or shrubs, sometimes vines, rarely dioecious, rarely spiny. **Leaves** mostly alternate or rosulate, rarely opposite, usually entire or serrate-dentate only, less often pinnatifid-pinnatisect, rarely succulent. **Capitula** radiate, disciform or discoid, solitary, corymbose or paniculate. **Involucral bracts** generally imbricate in several rows. **Receptacle** mostly epaleate, sometimes paleate. **Ray florets** often many, female, fertile or sometimes sterile, rarely neuter with mostly slender blue, violet, purple, pink or frequently yellow or white lamina. **Outer florets** in disciform capitula frequently in several rows, female, tubular or filiform. **Disc florets** bisexual or often functionally male, sometimes distinctly divided into tube and limb, sometimes more funnel-shaped, 5-lobed, mostly yellow. **Anthers** mostly ecalcarate and ecaudate, rarely shortly caudate; apical appendage ovate-lanceolate, flat; endothecial tissue mostly of elongated cells, radial or rarely partly polarised. **Style** with oblong-linear style branches, above stigmatic portions prolonged into acute triangular-lanceolate to subulate, ventrally glabrous, dorsally pilose, sterile appendages; hairs mostly obtuse; stigmatic areas always in 2 separate lines. **Cypselas** rather uniform, mostly oblong-obovoid and ± ribbed, rarely shortly beaked; glabrous or pubescent with twin hairs. **Pappus** of scabrid-barbellate, rarely plumose, fine or coarse bristles, or scales, or both bristles and scales or 0.

Genera 174, worldwide, especially frequent in SW North America, along Andes in South America, sthn Afr., Australia, New Zealand and central Asia; 21 genera and 269 species in sthn Afr.

Cassini: 195 (1819a); Bremer: 398 (1994).

Key compiled from descriptions in Bremer (1994); Hilliard (1977) and key by Nesom: 86 (1994).

Key to genera

1a Plants dioecious ..... *Baccharis
1b Plants monoecious:
2a Pappus uniseriate:
3a Anthers shortly caudate; receptacle paleate ..... Poecilolepis
3b Anthers ecaudate; receptacle epaleate:
4a Capitula distinctly radiate:
5a Cypselas ellipsoid-oblong, with swollen margin and apically surmounted by horny collar ..... Polyarrhena
5b Cypselas strongly compressed, without apical ring:
6a Pappus of plumose bristles:
7a Fertile cypselas moderately to densely strigose-sericeous with filiform hairs; rays white to blue or yellow; pappus of ray cypselas similar to that of disc (sterile) cypselas, of plumose bristles ..... Zyrphelis
7b Fertile cypselas moderately to densely invested with short, white papillae or glabrous to glabrate; rays white to blue; pappus of ray cypselas 0 or of only 1 or 2 plumose or short-serrate bristles (with many bristles in 1 species), disc (sterile) cypselas with more bristles ..... Gymnostephium
6b Pappus of barbellate bristles:
8a Scandent or twining shrubs ..... Microglossa
8b Herbs or shrubs, not scandent or twining:
9a Disc florets bisexual, rarely functionally male; pappus bristles many ..... Felicia
9b Disc florets functionally male; pappus bristles 0 or 1–3 ..... Gymnostephium
4b Capitula disciform or discoid:
10a Capitula discoid ..... Felicia
10b Capitula disciform or shortly radiate:
11a Outer female florets in 1 row ..... Nolletia
11b Outer female florets in 2 to many rows:
12a Receptacle ± swollen; style branches with lanceolate appendages; pappus 0 or of 1 or 2 bristles ..... Dichrocephala
12b Characters not as above:
13a Pappus of few basally connate scaly bristles, a corona or 0 ..... Grangea
13b Pappus of many barbellate bristles:
14a Disc florets functionally male; cypselas turbinate; shrubs ..... Psiadia
14b Disc florets bisexual, rarely some functionally male; cypselas obovoid-oblong or ellipsoid, compressed; annual or perennial herbs, rarely shrubs:
15a Marginal florets (short rays) yellow ..... Nidorella
15b Marginal florets (short rays) white, pink or mauve:
16a Style branch appendages larger than stigmatic area, lanceolate-linear, acute or acuminate; cypselas obovoid-oblong, somewhat compressed, pubescent and glandular ..... Aster
16b Style branch appendages lanceolate to triangular; cypselas obovoid-oblong, sometimes compressed, pubescent ..... Conyza
2b Pappus biseriate:
17a Capitula radiate:
18a Pappus of bristles only:
19a Leaves in basal rosette; pappus of plumose bristles ..... Mairia
19b Leaves alternate, scattered along stem; pappus of barbellate bristles:
20a Style branch appendages longer than stigmatic area, lanceolate-linear, acute or acuminate ..... Aster
20b Style branch appendages shorter than stigmatic areas, lanceolate to triangular, acute or obtuse ..... *Erigeron
18b Pappus an outer row of scales and an inner row of bristles:
21a Pappus bristles plumose ..... Mairia
21b Pappus of barbellate bristles:
22a Leaves opposite ..... Engleria
22b Leaves alternate, rarely lower ones opposite:
23a Receptacle mostly paleate ..... Amellus
23b Receptacle epaleate:
24a Leaves small, ericoid; cypselas with 2 resin sacs in ribs ..... Chrysocoma
24b Leaves usually broad or long, not ericoid; cypselas without ribs and resin sacs ..... Aster
17b Capitula disciform or discoid:
25a Capitula disciform:
26a Pappus of bristles only ..... Conyza
26b Pappus of bristles and scales ..... Amellus
25b Capitula discoid:
27a Pappus of bristles only:
28a Perennial herbs; leaves alternate, sometimes radical; cypselas oblong-obovoid, slightly compressed, usually 3-ribbed, glandular ..... Heteromma
28b Shrublets or shrubs; leaves mostly opposite, sometimes fascicled or alternate; cypselas obovoid or turbinate, sometimes compressed, sometimes narrowed into short, apical beak, glabrous to villous ..... Pteronia

27b Pappus of bristles and scales:
29a Cypselas without resin sacs; receptacle mostly paleate ..... **Amellus**
29b Cypselas with resin sacs in ribs; receptacle epaleate:
30a Leaves opposite ..... **Engleria**
30b Leaves alternate, ericoid ..... **Chrysocoma**

Tribe **Calenduleae**

Herbs, subshrubs, shrubs or small trees; unarmed or sometimes spinescent. **Leaves** alternate or rarely opposite, petiolate or sessile, entire or serrate, dentate to variously lobed or dissected, glabrous, glandular or pubescent. **Capitula** radiate, corymbose or solitary, subsessile or shortly pedunculate to scapose. **Involucral bracts** uniseriate and subequal to imbricate with outer bracts gradually smaller. **Receptacle** epaleate. **Ray florets** female, rarely neuter; fertile or sterile; lamina short or long, yellow, white, pink, mauve, purple or blue, sometimes differently coloured on upper and lower side. **Disc florets** bisexual or more often functionally male, regular, funnel-shaped or indistinctly differentiated in tube and subcampanulate limb, 5-lobed, yellow, orange or reddish. **Anthers** ecalcarate, caudate; apical appendage ovate-triangular, obtuse or acute-acuminate, flat or somewhat concave; endothecial tissue polarised. **Style** sterile, shallowly bifid with short apical collar of hairs; or deeply bifurcate with hairs extending down below branches, or fertile, shortly bilobed, or deeply bifurcate; hairs mamillate or sometimes acute; stigmatic areas in 2 apically confluent lines. **Cypselas** homo-, di-, tri- or polymorphic; ray cypselas terete or triquetrous to 3-winged, smooth, tuberculate, aculeate or beaked, straight or curved, with or without cavities; or fruit a drupe; disc cypselas (when developed) laterally flattened with thickened margin, obovate, orbicular or elliptic. **Pappus** 0.

Genera 8, mainly sthn Afr., but also tropical and North Africa, Atlantic islands, southern and central Europe, SW and W Asia, east to Afghanistan; 8 genera and 88 species in sthn Afr.

Cassini: 161 (1819a); Nordenstam: 372 (1994).

Key compiled from genus descriptions after Nordenstam (1994).

Key to genera

1a Fruit a drupe ..... **Chrysanthemoides**
1b Fruit a cypsela:
2a Style deeply bifurcate with hairs reaching below point of furcation ..... **Garuleum**
2b Style shallowly bifid or bilobed with short apical collar of hairs:
3a Cypselas homomorphic, rarely hetero- or dimorphic:
4a Ray cypselas kidney-shaped with ventral cavity ..... **Gibbaria**
4b Ray cypselas 3-winged with apical fenestrate airchamber; sometimes some cypselas wingless and rostrate ..... **Tripteris**
4c Ray cypselas straight or somewhat curved, triquetrous, 3-winged or terete or ribbed or tuberculate or with various processes; with or without apical cavities ..... **Osteospermum**
3b Cypselas hetero- or polymorphic:
5a Disc florets mostly bisexual, fertile; disc cypselas laterally flattened with thickened margins ..... **Dimorphotheca**
5b Disc florets functionally male:
6a Outer ray cypselas cymbiform, somewhat curved, rostrate or triquetrous; inner distinctly curved, sometimes winged, sometimes annular; dorsally rugose to tuberculate-aculeate ..... ***Calendula**
6b Ray cypselas slightly curved and wingless or straight and 3-winged or rostrate and wingless, with or without apical cavity; smooth or rugose-aculeate ..... **Oligocarpus**
6c Ray cypselas straight or somewhat curved, triquetrous, 3-winged or terete or ribbed or tuberculate or with various processes; with or without apical cavities ..... **Osteospermum**

Tribe ***Cardueae**

Herbs or sometimes subshrubs or shrublets; latex sometimes present. **Leaves** alternate or sometimes rosulate, entire or dentate-pinnatisect to lobed, very often spiny or spinulose or unarmed. **Capitula** discoid, disciform or 'radiate' (radiant: not true ray florets); solitary or corymbose, sometimes clustered. **Involucral bracts** imbricate in several rows, chartaceous to scarious, often spine-tipped or with fimbriate-ciliate, lacerate or variously shaped appendages; innermost bracts rarely much elongated, spreading and coloured, simulating rays. **Receptacle** mostly densely setose, rarely areolate with fringed or scaly pit margins, paleate or epaleate. **Florets** regular or slightly irregular; mostly with slender tube and deeply or shallowly 5-lobed limb; outer florets sometimes elongated and radiating, sometimes tubular and irregularly few-lobed; all or central florets bisexual; outer florets sometimes female or neuter; functionally male and female florets in separate capitula in some *Cirsium* spp.; florets red, pink, purple, violet or blue, less frequently yellow or orange. **Anthers** calcarate and distinctly caudate; tails entire or fringed, rarely very short; apical appendage elongate, acute to acuminate and often somewhat thickened and rounded at apex, flat; endothecial tissue mostly polarised. **Filaments** often papillose-pilose or glabrous, rarely connate to a tube. **Style** with rather long, linear, dorsally papillose-pilose, sometimes connate style branches and with ring of hairs on a thickening beneath branches, rarely bilobed or with short branches; hairs acute. **Cypselas** oblong to obovoid-obconical, often laterally somewhat compressed or angular, generally glabrous or sometimes sparsely pubescent, or more densely sericeous, pale yellowish brown or frequently with dark brown to blackish streaks or spots, or entirely brown-blackish, mostly with distinct apical rim. **Pappus** of scabrid, barbellate or plumose bristles, sometimes deeply cleft, or of scales, or a short corona; bristles in 1 to several rows, subequal or very unequal and gradually longer inwards; simple or double with inner row of bristles, hairs or scales, rarely totally absent.

Genera 83, Eurasia and North Africa, few genera in tropical Africa and North America, few in South America and Australia; 6 genera and 12 species in sthn Afr., mostly weeds.

Cassini: 155 (1819a); Pope: 49 (1992); Bremer: 134 (1994).

Key to genera

1a Dwarf shrubs; leaves with a spinose-dentate margin ..... *Carthamus
1b Herbs; leaves not as above:
2a Pappus with hairs connate at base:
3a Pappus of plumose hairs ..... *Cirsium
3b Pappus of scabrid hairs:
4a Filaments free ..... *Carduus
4b Filaments connate ..... *Silybum
2b Pappus with hairs free to base:
5a Pappus of long, subacuminate scales surrounded by long hairs ..... *Mantisalca
5b Pappus of several rows of simple, sometimes scale-like, hairs ..... *Centaurea

Tribe **Eremothamneae**

Erect, much-branched shrubs. **Leaves** alternate, sessile, oblanceolate to thorn-like. **Capitula** radiate or discoid; sessile or subsessile, solitary or in small clusters in axils of distal leaves. **Involucral bracts** multiseriate, glabrous, usually with short apical spine. **Receptacle** epaleate. **Ray florets** (if present) female, corolla yellow, with 3 small apical lobes. **Disc florets** bisexual, 5-lobed, lobes linear, with or without glands or hairs outside; surface cells elongate, with rows of low papillae on marginal cells. **Anthers** calcarate and caudate; endothecial cells with transverse thickenings in basal half only; apical appendage of thin-walled cells. **Style** branches elongate, slender, with single continuous stigmatic surface inside each branch, with sweeping hairs on top of shaft and on backs of branches consisting of 2 or 3 cells divided longitudinally. **Cypselas** prismatic, densely setuliferous with long biseriate hairs. **Pappus** capillary, in 2 or 3 rows, inner bristles sometimes narrowly winged below.

Genera 2, *Eremothamnus* O.Hoffm. and *Hoplophyllum* DC., endemic to sthn Afr.

Robinson & Brettell: 164 (1973); Robinson: 34 (1994).

Key to genera after Robinson: 36 (1994).

Key to genera

Capitula discoid; leaves spiniform; corolla limbs glabrous; anther appendages shortly oblong with apiculate tips..... **Hoplophyllum**
Capitula radiate; leaves oblanceolate; corolla limbs with hairs and glands outside; anther appendages lanceolate.... **Eremothamnus**

Tribe **Eupatorieae**

Herbs, shrubs or vines. **Leaves** generally opposite, frequently entire, sometimes serrate or lobed, usually petiolate, rarely sessile, frequently trinerved. **Capitula** discoid; usually corymbose-paniculate, rarely solitary, few- to many-flowered. **Involucral bracts** mostly unequal and subimbricate to imbricate in several rows or subequal in 1 or 2 rows (eximbricate). **Receptacle** mostly epaleate and glabrous, rarely paleate. **Disc florets** bisexual, regular, 5-lobed, white, pink, purple, violet or blue, never yellow. **Anthers** ecalcarate or rarely shortly calcarate, ecaudate; anther appendage ovate-lanceolate to oblong; endothecial tissue radial; filament collar elongate-oblong, sometimes widened, cells often with annular thickenings. **Style** with very long, filiform-linear to oblanceolate-clavate, smooth-mamillose to papillose-pilose, usually coloured, sterile style branch appendages; hairs obtuse; stigmatic areas in 2 short, widely separated marginal lines at base of each style branch; glands sometimes present between stigmatic bands; style base sometimes pubescent. **Cypselas** rather uniform, black, mostly oblong and prismatic with ± 5 ribs, more rarely with 7–10 ribs, rarely flattened; glabrous or pubescent with twin hairs. **Pappus** usually of many scabrid-barbellate bristles, or of few bristles or scales, or both bristles and scales, rarely coroniform or 0.

Genera 170, mainly South, Central and North America, West Indies, a few pantropical genera in Africa and South America and pantropical weeds, only 1 genus extending through Asia to Europe and North Africa; 7 genera and 13 species in sthn Afr.

Cassini: 202 (1819a); Bremer *et al.*: 643 (1994).

Key to genera

1a Anthers without an apical appendage or minutely apiculate; pappus of 3 or 5 gland-tipped processes..... **Adenostemma**
1b Anthers with an apical appendage; pappus of eglandular bristles or scales:
2a Pappus of scales ..... *Ageratum
2b Pappus of bristles:
3a Involucral bracts 4 or 5; plant a twiner or scrambler ..... **Mikania**
3b Involucral bracts many, if few; plant erect, not twining:
4a Receptacle rounded to conical ..... *Campuloclinium
4b Receptacle flat or convex:
5a Individual pappus bristles easily deciduous ..... *Ageratina

5b Pappus bristles persistent, not easily deciduous:
6a Involucral bracts with tips coloured, deciduous; pappus of many, capillary bristles ..... *Chromolaena
6b Involucral bracts and pappus not as above; cypselas 5- to 8-ribbed, with many setulae ..... Stomatanthes

Tribe Gnaphalieae

Herbs or often shrubs or shrublets. **Leaves** alternate or opposite, sessile or petiolate; margin flat, involute or revolute, mostly entire with hairs of type B (hairs with 1 basal cell and a very long terminal cell). **Capitula** disciform or discoid, rarely radiate, solitary or in groups or forming secondary heads of various shapes. **Involucral bracts** imbricate in several rows, papery, sometimes chartaceous or herbaceous; with white, pink, yellow or purple opaque papery lamina or brownish or hyaline, transparent; stereome generally undivided but characteristically divided (fenestrate) in some groups. **Receptacle** generally flat to somewhat convex and epaleate, sometimes conical or peg-like; rarely paleate; squamose or fimbrilliferous. **Outer florets** often 0, when present, filiform or radiate, rarely bilabiate, female, yellow or purple to white, sometimes blue, in 1 or several rows, fewer than or outnumbering central florets. **Central florets** bisexual or often functionally male; corolla yellow or purple to blackish, corolla lobes erect or retrofract. **Anthers** ecalcarate, caudate with short or long tails; apical appendage mostly ovate, sometimes oblong, rarely cordate, flat, sometimes concave and/or narrow. **Style** usually with oblong-linear, truncate and apically penicillate style branches or sometimes obtuse with hairs dorsally or acute or prolonged; hairs obtuse; stigmatic areas in 2 separate lines. **Cypselas** often small, generally oblong or obovoid, sometimes triquetrous, variously hairy with either elongated, short, clavate or globose twin hairs, myxogenic or not, sometimes glabrous (exceptionally glandular); epidermis smooth or rarely papillose. **Pappus** of free or connate, plumose or barbellate, capillary bristles in 1 to several rows, rarely with scales and bristles or scales only, or 0; basally with or without patent cilia; apical cells acute or sometimes clavate; opaque or not.

Genera 176, worldwide but particularly in sthn Afr. and Australia; 56 genera and 553 species in sthn Afr.

Lecoq & Juillet: 296 (1831); Bentham: 452 (1866); Anderberg: 59 (1991a); Anderberg: 320 (1994).

Key after Anderberg: 34 (1991a); Anderberg & Bremer: 1068 (1991); Nordenstam: 407 (1996).

Key to genera

1a Leaves denticulate, dentate, serrulate, serrate or lobed; involucral bracts cartilaginous or herbaceous, without papery lamina:
2a Capitula radiate:
3a Receptacle paleate:
4a Pappus of barbellate bristles and crown of scales ..... Philyrophyllum
4b Pappus of rigid awns:
5a Involucral bracts with terminal arista; ray florets purple; disc florets yellow; pappus of 5 scale-like awns with bristle-like projection ..... Alatoseta
5b Involucral bracts without arista; ray florets creamy white or blue; disc florets purplish black; pappus of few rigid canaliculate awns ..... Callilepis
3b Receptacle epaleate:
6a Ray florets yellow or white; pappus of bristles in 1 row with outer row of scales (N.B. some *Printzia* species may have yellow or greenish ray florets but then with pappus of bristles in many rows) ..... Pentatrichia
6b Ray florets purple; pappus of bristles in several rows:
7a Leaves broad (more than 10 mm); anthers projecting out of corolla at early stage, preflorally ..... Printzia
7b Leaves narrow (less than 10 mm); anthers projecting at later stage, postflorally:
8a Involucral bracts with shortly stalked glandular hairs; cypselas hairy but without glands; leaves xeromorphic, needle-like ..... Athrixia
8b Involucral bracts with long-stalked glandular hairs; cypselas hairy and glandular; leaves herbaceous..... Lepidostephium
2b Capitula discoid or disciform:
9a Pappus of slender, capillary bristles and scales; involucral bracts recurved; capitula discoid:
10a Leaf surface smooth, veins indistinct; capitula large (more than 10 mm); pappus with 5–8 bristles ..... Anisothrix
10b Leaf surface more or less rugose, veins distinct; capitula small (less than 10 mm); pappus with 4 or 5 bristles..... Pentatrichia
9b Pappus of bristles only or of rigid awns or of short rigid bristles and scales; involucral bracts not recurved; capitula discoid or disciform:
11a Leaves large, deeply lobed; capitula small, discoid, in large divaricate, leafy panicles; corolla very deeply lobed... Anisochaeta
11b Leaves smaller, not lobed; capitula disciform, not in divaricate panicles; corolla with short lobes:
12a Stem and leaves villose; florets yellow; pappus of short rigid bristles and short scales ..... Artemisiopsis
12b Stem and leaves glabrous or puberulous; florets white or blue; pappus of 1 plumose capillary bristle only ..... Denekia
1b Leaves entire or else involucral bracts have a papery lamina:
13a Involucral bracts cartilaginous or herbaceous; capitula radiate:
14a Leaves small, densely tomentose to villose on both sides ..... Printzia
14b Leaves often glabrous and shiny above, not tomentose or villose on both sides:
15a Pappus of triquetrous awns; ray florets creamy white or blue; disc florets purplish black ..... Callilepis
15b Pappus of capillary bristles; florets not as above:

16a Pappus bristles in several rows; ray florets not yellow (*Athrixia* and *Lepidostephium*, but see also *Macowania pinifolia*) ..... go to couplet 8
16b Pappus of bristles in 1 row or 0; ray florets yellow or white:
17a Leaves very long and slender, acicular; pappus 0 ..... **Oxylaena**
17b Leaves not very slender, short to moderately long, not acicular; pappus of barbellate bristles:
18a Leaves flat, very pungent; corolla with long woolly hairs; pappus bristles caducous ..... **Arrowsmithia**
18b Leaves revolute, pungent or not; corolla without woolly hairs; pappus bristles persistent ..... **Macowania**
13b Involucral bracts with papery lamina or else capitula disciform or discoid:
19a Capitula radiate:
20a Ray florets yellow:
21a Plants compact, cushion-forming ..... **Oreoleysera**
21b Plants not cushion-forming:
22a Pappus of capillary bristles, scales 0 ..... **Antithrixia**
22b Pappus at least in ray florets with conspicuous scales, bristles present or 0:
23a Pappus bristles distinctly plumose ..... **Leysera**
23b Pappus bristles scabrid-barbellate or 0:
24a Annual or biennial herbs:
25a Cypselas densely hairy with long, apically coiled hairs ..... **Rhynchopsidium**
25b Cypselas almost glabrous ..... **Nestlera**
24b Perennial subshrubs, shrublets or shrubs:
26a Disc florets with 1–4 pappus bristles ..... **Rosenia**
26b Disc florets without pappus bristles:
27a Plants glabrous (if hairy then with capitula congested in secondary heads); capitula generally cymose-corymbose to clustered in secondary heads (if solitary then with glabrous, ± distinctly 1-nerved leaves) ..... **Oedera**
27b Plants ± hairy or glandular-hairy (if glabrous then with distinctly 3–9-nerved leaves); capitula generally solitary (if corymbose then with hairy leaves):
28a Leaves with long, glandular hairs ..... **Comborhiza**
28b Leaves without long, glandular hairs ..... **Relhania**
20b Ray florets purple, pink or white:
29a Plants compact, moss-like; disc florets wine-red ..... **Bryomorphe**
29b Plants not moss-like; disc florets yellow, pink or white:
30a Pappus of 5 broad scale-like awns with bristle-like projection; involucral bracts with long terminal arista… ..... **Alatoseta**
30b Pappus of plumose capillary bristles:
31a Capitula few-flowered, in dense globose clusters ..... **Disparago**
31b Capitula with more florets; well separated in loose clusters ..... **Amphiglossa**
19b Capitula disciform or discoid:
32a Involucral bracts entirely cartilaginous or herbaceous or sometimes with minute papery apical portion:
33a Capitula 1-flowered ..... **Stoebe**
33b Capitula with 2 or more florets:
34a Capitula arranged in spikes or in dense glomerules ..... **Elytropappus**
34b Capitula solitary, neither arranged in spikes nor in dense glomerules:
35a Capitula small; pappus of plumose bristles ..... **Amphiglossa**
35b Capitula larger; pappus of barbellate bristles ..... **Lachnospermum**
32b Involucral bracts conspicuously papery:
36a Florets purple, at least apically or basally:
37a Leaves adaxially concave, often tomentose adaxially only:
38a Leaves twisted or straight; capitula discoid; pappus barbellate:
39a Capitula large, more or less campanulate, rather few:
40a All involucral bracts conspicuously white; leaves linear, ericoid ..... **Hydroidea**
40b Only innermost bracts conspicuously white; leaves neither ericoid, nor linear:
41a Apical pappus cells white, opaque ..... **Atricantha**
41b Apical pappus cells hyaline, transparent ..... **Calotesta**
39b Capitula small, narrowly cylindrical, many:
42a Apical pappus cells clavate ..... **Metalasia**
42b Apical pappus cells acute ..... **Planea**
38b Leaves straight; capitula disciform or sometimes discoid but then pappus plumose:
43a Capitula large (more than 10 mm):
44a Cypselas villose; involucral bracts pink; leaves minute, extremely densely adpressed ..... **Phaenocoma**
44b Cypselas pilose or almost glabrous; involucral bracts white, yellow, reddish or brown; leaves not minute:
45a Leaves small, triangular, erect, adpressed, adaxially concave and tomentose, abaxially glabrous… ..... **Edmondia**
45b Leaves not small and triangular, flattened, not erect, nor glabrous abaxially ..... **Syncarpha**

43b Capitula small (less than 10 mm):
46a Disc florets generally bisexual; pappus bristles basally with patent cilia, apical cells clavate; endothecial tissue radial ..... **Ifloga**
46b Disc florets functionally male; pappus bristles basally without patent cilia, apical cells not clavate; endothecial tissue polarised ..... **Trichogyne**
37b Leaves flat or revolute, not tomentose adaxially only:
47a Capitula discoid or disciform with female florets not outnumbering disc florets:
48a Capitula discoid (or occasionally with 1 or 2 filiform female florets):
49a Capitula few, on filiform peduncles ..... **Troglophyton**
49b Capitula several, ± sessile, in glomerules ..... **Vellereophyton**
48b Capitula disciform (female florets frequent):
50a Stereome divided:
51a Capitula few, on filiform peduncles ..... **Troglophyton**
51b Capitula several, ± sessile, in glomerules ..... **Vellereophyton**
50b Stereome undivided:
52a Receptacle paleate:
53a Leaves revolute, glabrous above, decurrent; cypselas with scattered, short, clavate myxogenic hairs ..... **Tenrhynea**
53b Leaves flat, villose above, not decurrent; cypselas villose with elongated nonmyxogenic hairs... ..... **Petalacte**
52b Receptacle epaleate:
54a Involucral bracts not unguiculate; outer ones without petaloid portion, inner ones with elongate petaloid portion; pappus bristles with apical teeth short, subclavate, opaque; disc floret style bifurcate ..... **Langebergia**
54b Inner involucral bracts unguiculate with broader petaloid portion, outer ones partly membranous, not clawed:
55a Leaves glabrous above (or sparsely pilose); flowering branches apically usually with reduced leaves (= corymbophore present); corolla purplish; pappus reduced especially in female florets ..... **Anaxeton**
55b Leaves tomentose on both sides (though sometimes glabrescent above with age); flowering branches evenly leafy to top (= corymbophore 0); corolla white or yellow; pappus bristles well-developed in all florets ..... **Anderbergia**
47b Capitula disciform with female florets outnumbering disc florets:
56a Stereome divided:
57a Pappus bristles basally connate in groups, pappus plumose ..... ***Facelis**
57b Pappus bristles basally free or cohering by patent cilia:
58a Stereome conspicuously divided; pappus generally distinctly plumose or else cypselas with 2-celled, globose or unicellular, clavate hairs ..... **Lasiopogon**
58b Stereome indistinctly divided; pappus barbellate or possibly subplumose but then cypselas not as above:
59a Capitula few, on filiform peduncles ..... **Troglophyton**
59b Capitula several, ± sessile, in glomerules ..... **Vellereophyton**
56b Stereome undivided:
60a Cypselas with globose hairs; pappus basally connate ..... ***Gamochaeta**
60b Cypselas with clavate or elongated hairs; pappus free, connate or 0:
61a Perennial herbs with long, straggling branches ..... **Plecostachys**
61b Perennial or annual herbs; branches never long and straggling ..... **Gnaphalium**
36b Florets yellow:
62a Leaves minute, densely adpressed; involucral bracts white; cypselas villose ..... **Dolichothrix**
62b Characters not as above:
63a Outer involucral bracts subtending single female floret; pappus apically plumose:
64a Disc florets generally bisexual; pappus bristles basally with patent cilia, apical cells clavate; endothecial tissue radial ..... **Ifloga**
64b Disc florets functionally male; pappus bristles basally without patent cilia, apical cells not clavate; endothecial tissue polarised ..... **Trichogyne**
63b Outer involucral bracts not subtending single female floret; pappus various:
65a Capitula surrounded by involucre of lanate, radiating leaves ..... **Galeomma**
65b Capitula not surrounded by lanate, radiating leaves:
66a Capitula discoid:
67a Ovaries with relatively large and conspicuous white hairs, pappus bristles fused at base in a smooth ring, shaft usually plumose, rarely barbellate or smooth ..... **Syncarpha**
67b Ovaries either without large white hairs or pappus bristles not fused at base (although they may cohere strongly by patent cilia) ..... **Helichrysum**
66b Capitula disciform:
68a Female florets outnumbering disc florets:
69a Pappus bristles apically plumose, basally connate; stereome undivided; cypselas with globose, myxogenic twin-hairs ..... **Helichrysopsis**

69b Pappus bristles barbellate, basally free; stereome divided; cypselas never with globose twin-hairs:
70a Capitula with less than 20 florets ..... **Helichrysum**
70b Capitula with more than 20 florets ..... **Pseudognaphalium**
68b Female florets fewer than disc florets:
71a Capitula large, solitary or few together; pappus basally connate, of many distinctly plumose bristles; cypselas with globose hairs ..... **Syncarpha**
71b Capitula large or small; pappus barbellate or only somewhat plumose but then with few, basally free bristles and cypselas not with globose hairs:
72a Capitula large, solitary; leaves small, triangular, adpressed, concave and adaxially tomentose.. ..... **Edmondia**
72b Capitula small or, if large, then leaves not as above ..... **Helichrysum**

Tribe **Helenieae**

Herbs, subshrubs or shrubs. **Leaves** generally opposite, at least below, sometimes alternate throughout or rosulate, entire or serrate-dentate to pinnatisect or lobed, often trinerved. **Capitula** radiate or discoid, rarely disciform, solitary or corymbose-paniculate. **Involucral bracts** generally in 1 or 2, sometimes 3, rarely 4 rows, generally herbaceous, occasionally scarious, sometimes partly or wholly connate. **Receptacle** generally epaleate. **Ray florets** female, rarely female-sterile or neuter, mostly yellow or white, sometimes violet, pink, reddish, orange, purplish, brownish or greenish. **Disc florets** bisexual, rarely functionally male, generally with narrow tube and expanding limb, sometimes funnel-shaped, generally 5-lobed or sometimes 4-lobed, generally yellow, rarely white, pink, violet, purple, orange or greenish. **Anthers** generally shortly calcarate or sometimes distinctly ecalcarate, usually ecaudate, rarely caudate; appical appendage generally ovate to cordate, rarely narrowly oblong, sometimes glandular; endothecial tissue polarised, rarely radial; filament collar sometimes broadened towards base, dilated. **Style** with oblong-linear style branches generally with sterile appendages of ± fused hairs, or sometimes truncate and apically penicillate; hairs obtuse; stigmatic areas in 2 separate lines. **Cypselas** brown to blackish, with or without striations, usually with short to long twin hairs; ray cypselas generally triquetrous, sometimes partly or wholly enclosed by subtending involucral bracts; disc cypselas generally terete or prismatic. **Pappus** generally of scales with or without extended bristle-like midrib, entire or sometimes dissected, sometimes of barbellate or plumose bristles; sometimes 0.

Genera 110, North, Central and South America, more rarely in tropical Africa and Asia, Eurasia, Hawaiian Islands, 1 species native to Australia; 5 genera and 5 species in sthn Afr., mostly naturalised weeds.

Lindley: 1074 (1829); Bentham: 199 (1873a); Karis & Ryding: 533 (1994).

Key based on Hilliard: 324 (1977).

Key to genera

1a Involucral bracts connate for most of their length, gland-dotted ..... ***Tagetes**
1b Involucral bracts free; not gland-dotted:
2a Involucral bracts many, appressed hairy, margins with long bristles ..... ***Gaillardia**
2b Involucral bracts few (± 3–6), glabrous:
3a Leaves pinnate, alternate; individual heads solitary on long peduncles ..... ***Schkuhria**
3b Leaves simple, opposite:
4a Capitula small, aggregated into secondary capitula, terminal and axillary; pappus 0 ..... ***Flaveria**
4b Capitula large, solitary on long peduncles at ends of branches; pappus present, of ± fimbriately winged setae, usually uncinate ..... **Hypericophyllum**

Tribe **Heliantheae**

Herbs, subshrubs or shrubs, sometimes aquatic herbs. **Leaves** generally opposite, at least below, sometimes alternate throughout or rosulate; entire or serrate-dentate to pinnatisect or lobed, often trinerved, often scabrid with multiseptate hairs or woolly hairs or glabrous. **Capitula** radiate, discoid or rarely disciform, solitary or in variously arranged synflorescences. **Involucral bracts** in 1–3, sometimes many, rows; generally herbaceous, sometimes scarious, chartaceous, membranous or foliaceous, sometimes distinctly dimorphic or with scarious margins. **Receptacle** paleate, paleae flat or often conduplicate, membranous or with herbaceous, or rarely lignified-pungent tip, deciduous or persistent. **Ray florets** generally female and fertile, sometimes sterile or neuter, usually yellow, sometimes white, rarely pink, red or purple. **Disc florets** bisexual or functionally male, generally with narrow tube and expanding limb, shallowly 5-lobed, sometimes shallowly 4-lobed, generally yellow, rarely white, purplish or greenish; lobes frequently papillose adaxially. **Anthers** shortly calcarate, ecaudate, usually blackish, sometimes pale, rarely reddish, greenish or yellowish; apical appendage generally ovate to cordate, concave, acute, sometimes truncate to emarginate or acuminate, often glandular; endothecial tissue usually polarised, rarely radial; filament collar generally broadened towards base, dilated, sometimes continuous around filament. **Style** with oblong-linear style branches, generally with sterile appendages of ± fused hairs or sometimes truncate and apically penicillate; hairs obtuse; stigmatic areas in 2 separate lines or sometimes with continuous stigmatic areas. **Cypselas** brown to blackish, usually with short to long twin hairs, sometimes glabrous; ray cypselas generally triquetrous, sometimes dorsiventrally compressed and then generally with multiseptate hairs, or rarely laterally compressed; disc cypselas angular or laterally compressed and ± enclosed by subtending paleae, sometimes dorsiventrally compressed. **Pappus** of stout to fragile awns, scales and/or barbellate to plumose bristles, rarely coroniform or sometimes 0.

Genera 189, worldwide but mainly in North and South America; 25 genera and 46 species in sthn Afr., mostly naturalised weeds.

Cassini: 189 (1819a); Karis & Ryding: 578 (1994).

Key after Wild: 1 (1967) and Hilliard: 290 (1977).

Key to genera

1a Capitula unisexual:
- 2a Involucral bracts of male capitula connate; female capitula 1-flowered; cypsela clasped by female involucre which bears 4–6 spines ..... ***Ambrosia**
- 2b Involucral bracts of male capitula free; female capitula 2-flowered; cypsela clasped by female involucre bearing hooked spines ..... ***Xanthium**

1b Capitula bisexual:
- 3a Florets of disc sterile:
  - 4a Cypselas tightly clasped by one of the inner involucral bracts which developed hooked spines; pappus 0 ..... ***Acanthospermum**
  - 4b Cypselas clasped by an involucral scale and 2 lateral, concave, involucral paleae; pappus of 2 recurved awns clasping the margin of the cypsela ..... ***Parthenium**
- 3b Florets of disc fertile (or only innermost sterile):
  - 5a Receptacular paleae ± flat not clasping cypselas:
    - 6a Involucral bracts quite free, the inner merging gradually into the receptacular paleae; leaves simple:
      - 7a Pappus 0; lamina of ray florets golden yellow ..... ***Guizotia**
      - 7b Pappus present; lamina of ray florets white, cream or yellow:
        - 8a Pappus of densely plumose bristles ..... ***Tridax**
        - 8b Pappus of scales, persistent or caducous:
          - 9a Pappus of 2 scales, soon caducous, cypselas winged; large yellow rays ..... ***Coreopsis**
          - 9b Pappus of several scales, cypselas not winged; very small, white rays ..... ***Galinsoga**
    - 6b Involucral bracts of the inner row connate at base, outer row fewer and mostly smaller or narrower; leaves variously divided:
      - 10a Leaves alternate ..... ***Chrysanthellum**
      - 10b Leaves opposite:
        - 11a Ray florets yellow, golden, orange or 0 ..... **Bidens**
        - 11b Ray florets white, pink, lilac or red ..... ***Cosmos**
  - 5b Receptacular paleae ± conduplicate and clasping or enfolding cypselas:
    - 12a Involucral bracts 4, in 2 rows of opposite pairs, leafy; flower heads axillary, sessile or subsessile ..... **Enydra**
    - 12b Involucral bracts 3 to many, but not in 2 rows of opposite pairs and leafy; capitula not sessile or subsessile and axillary:
      - 13a Inner involucral bracts embracing fertile ray cypselas; involucral bracts spathulate and densely glandular ..... ***Sigesbeckia**
      - 13b Inner involucral bracts not embracing outermost cypselas:
        - 14a Leaves alternate as a rule; receptacular paleae cymbiform, clasping cypselas and produced above into a ± tubular neck; ray florets 0 or neuter ..... **Sclerocarpus**
        - 14b Leaves opposite, sometimes alternate above:
          - 15a Cypselas surmounted by a distinct, often lacerate cupule; additional pappus bristles present or 0:
            - 16a Ray florets sterile (although style and stigmas rarely present); all cypselas ± alike, bilaterally convex or obscurely 4-angled ..... **Aspilia**
            - 16b Ray florets fertile (with style and stigmas and producing mature cypselas; outer cypselas ± triquetrous:
              - 17a Laminas conspicuous, yellow; leaves lobulate; petioles short; capitula long-pedunculate; cypselas tuberculate with caducous aristae ..... ***Sphagneticola**
              - 17b Laminas small, white; leaves simple; petioles slender; capitula subsessile or shortly pedunculate; cypselas minutely transversely rugulose with persistent barbellate awns ..... **Blainvillea**
          - 15b Cypselas without pappus or with pappus of various kinds, but not a cupule:
            - 18a Ray florets persistent; annual herbs up to 0.6 m tall; unbranched; leaves narrowly oblong-ovate ..... ***Zinnia**
            - 18b Ray florets not persistent:
              - 19a Cypselas 4-sided; capitula large and showy with orange-red or yellow ray florets; apex of peduncles becoming very thick ..... ***Tithonia**
              - 19b Cypselas ± compressed or, if not noticeably compressed, peduncles not swollen above:
                - 20a Receptacular paleae obovate, truncate-emarginate and caudate-spinescent at apex; perennial shrubs up to 6 m tall with white rays ..... ***Montanoa**
                - 20b Receptacular paleae not caudate-spinescent:
                  - 21a Disc florets deep purple, at least above ..... ***Helianthus**
                  - 21b Disc florets not purple:
                    - 22a Disc florets white; receptacular paleae very narrow and often setiform ..... ***Eclipta**
                    - 22b Disc florets not white, ± yellowish:
                      - 23a Cypselas thick or angular, not compressed, pubescent at apex, not winged or margined ..... ***Melanthera**
                      - 23b Cypselas ± compressed, winged or with a hyaline cartilaginous margin:

24a Cypsela with broad, irregular margin; lamina of ray florets 10 mm long or more..... *Verbesina
24b Cypsela with hyaline, cartilaginous margin; ray florets ± 1.3 mm long or 0 ..... Spilanthes

Tribe **Inuleae**

Herbs, subshrubs or shrubs, occasionally with winged stems. **Leaves** generally alternate, sometimes opposite, entire to pinnatifid or pinnatisect, serrate or dentate, often glandular and hairy, hairs of type A (multiseptate hairs with short cells). **Capitula** radiate, disciform or discoid, solitary, corymbose or paniculate. **Involucral bracts** imbricate in several rows, chartaceous or herbaceous. **Receptacle** flat or convex, usually smooth, sometimes honeycombed, generally epaleate, rarely paleate. **Ray florets** female, in 1, 2 or rarely several rows, lamina generally yellow or whitish and well-developed, but sometimes very short or 0; occasionally outer florets filiform and sometimes pink to crimson; adaxial epidermal cells of ray florets elongated with rugose or longitudinally striate cuticle. **Disc florets** bisexual, yellow, sometimes purple or white, generally with 5 short lobes; corolla epidermal cells with straight walls. **Anthers** ecalcarate or calcarate, caudate, tails long and branched or short and ± unbranched; endothecial tissue generally of elongate cells, radial or polarised. **Style** with oblong to linear, rounded style branches and hairs reaching to bifurcation, rarely below bifurcation; hairs acute or rarely obtuse; stigmatic areas in 2 apically confluent lines. **Cypselas** ellipsoid, turbinate or triquetrous, often with ribs, glabrous or with elongated not myxogenic twin hairs; cypsela epidermis sometimes with 1 elongated calcium oxalate crystal in each cell. **Pappus** of scales only or composed of ± free, barbellate, rarely plumose, capillary bristles in 1 row, with or without outer row of small scales or rarely 0.

Genera 38, mainly northern hemisphere, particularly Europe, North Africa, Arabian Peninsula, Middle East and Central Asia; few genera in tropical and sthn Afr.; 12 genera and 47 species in sthn Afr.

Cassini: 193 (1819a); Anderberg: 85 (1991b); Anderberg: 282 (1994).

Key to the genera of the Inuleae partly after Anderberg: 85 (1991b).

Key to genera

1a Pappus 0, or of wide scales, often with protruding bristle-like mid-portion, or very short, not of capillary bristles:
2a Receptacle epaleate:
3a Receptacle clothed with many bristles..... **Geigeria**
3b Receptacle without bristles..... **Calostephane**
2b Receptacle paleate:
4a Stem winged; pappus of very short barbellate bristles..... **Ondetia**
4b Stem not winged; pappus of scales or 0 ..... **Anisopappus**
1b Pappus of well-developed capillary bristles:
5a Pappus of bristles and scales:
6a Pappus bristles plumose ..... **Pegolettia** in part
6b Pappus bristles barbellate:
7a Pappus scales forming short connate cup; capitula generally disciform..... **Pulicaria**
7b Pappus scales ± free; capitula discoid ..... **Pegolettia** in part
5b Pappus of bristles only:
8a Capitula discoid:
9a Leaves pinnatifid or profoundly lobed..... **Antiphiona**
9b Leaves neither pinnatifid nor lobed:
10a Capitula small, few-flowered..... ***Pentanema**
10b Capitula larger, many-flowered..... **Inula glomerata**
8b Capitula radiate or disciform:
11a Marginal florets female, filiform:
12a Leaves linear-lanceolate, sessile, margin entire; involucral bracts linear-lanceolate, distinctly imbricate; stems sometimes narrowly winged ..... **Pechuel-Loeschea**
12b Leaves elliptic to ovate, petiolate, margins serrate; involucral bracts many, linear-filiform; stems never winged ..... **Blumea**
11b Marginal florets female, radiate or miniradiate:
13a Endothecial tissue radial..... **Inula paniculata**
13b Endothecial tissue polarised ..... ***Dittrichia**

Tribe **Lactuceae**

Herbs, rarely subshrubs; latex abundant. **Leaves** alternate or often rosulate, entire or frequently dentate-pinnatisect to lobed, sometimes spinulose. **Capitula** ligulate; solitary or cymose to corymbose-paniculate, rarely in spike-like or racemose synflorescences. **Involucral bracts** in several rows or frequently in 2 distinct unequal rows, rarely in single row; often herbaceous, sometimes scarious-margined. **Receptacle** mostly epaleate and naked or rarely paleate. All **florets** bisexual, ligulate (i.e. strap-shaped with 5 apical lobes), mostly yellow or often violet, blue, pink, purple or white, rarely orange-red, sometimes with pilose tube. **Anthers** calcarate and caudate; apical appendage elongate and obtuse-rounded; endothecial tissue radial; filaments smooth. **Style** slender, mostly with rather long and slender style branches, evenly pilose with long or short hairs on shaft and along branches; hairs acute. **Cypselas** terete to ellipsoid-

fusiform to obovoid-obconical, sometimes compressed or flattened, frequently ribbed or angular, sometimes scabrid-muricate or tuberculate, mostly glabrous or sparsely pubescent, often with long beak. **Pappus** mostly of scabrid-barbellate bristles, more rarely of plumose bristles, sometimes with outer row of hairs or with intermixed hairs, rarely of minute scales, sometimes 0.

Genera 98, mainly northern hemisphere and especially southern Europe, North Africa, SW and central Asia, western North America, rarely in tropical and sthn Afr., tropical Asia, South America, Australia and New Zealand; 13 genera and 51 species in sthn Afr., mostly weeds.

Cassini: 151 (1819a); Pope: 189 (1992); Bremer: 175 (1994).

Key after Hilliard: 596 (1977).

Key to genera

1a Pappus of small scales up to 2 mm long ..... ***Cichorium**
1b Pappus of hairs or bristles at least 4 mm long:
2a Hairs of pappus feathery or at least inner ones so:
3a Receptacular paleae present ..... ***Hypochaeris**
3b Receptacular paleae 0:
4a Plants glabrous at maturity, sometimes floccose when young ..... ***Tragopogon**
4b Plants rough hairy:
5a Pappus in 1 row; fruit with a stout hollow beak ..... ***Urospermum**
5b Pappus in 2 rows; fruit beak slender, not hollow ..... ***Picris**
2b Hairs of pappus not feathery, at most somewhat barbellate:
6a Cypselas 2–3.5 mm long, obconic, truncate above, pappus of comparatively few coarse scabrid bristles ..... **Tolpis**
6b Cypselas and pappus not as above:
7a Cypselas tuberculate in upper part with a long slender beak; scapes one-headed, hollow ..... ***Taraxacum**
7b Cypselas and scapes not as combined above, or plants not scapigerous:
8a Pappus dimorphic:
9a Pappus of setae and fine down-like hairs intermixed ..... **Sonchus**
9b Pappus in outer florets a small corona, in inner florets of few coarse, basally flattened and scale-like, scabrid bristles ..... ***Hedypnois**
8b Pappus of setae only, monomorphic, rarely with an outer ring of very short setae:
10a Cypselas truncate, without ascending hairs or ascending rough projections on the ribs or margins ..... **Launaea**
10b Cypselas beaked or at least somewhat attenuate above with ascending hairs or rough projections on the ribs or at least on the margins:
11a Cypselas ± compressed and equal-ribbed, with ascending evident or submicroscopic hairs on the ribs or at least the margins; involucres mostly cylindrical ..... ***Lactuca**
11b Cypselas ± terete and equal-ribbed, rough with ascending projections on the ribs; involucres usually ob-conic:
12a Capitula many-flowered; involucre hairy ..... ***Crepis**
12b Capitula with 8–15 flowers; involucre glabrous ..... ***Youngia**

Tribe **Mutisieae**

Herbs, shrubs or trees, sometimes xerophytic and spiny. **Leaves** alternate or rosulate, entire to variously dentate-lobed or sometimes pinnatisect. **Capitula** discoid, disciform or radiate, solitary or variously arranged. **Involucral bracts** generally chartaceous and in several rows, more rarely herbaceous and in few rows. **Receptacle** epaleate. **Marginal florets** (if present) bilabiate with expanded lamina, only occasionally without adaxial lobes, bisexual, female or neuter; few species with disciform capitula with inconspicuous, female marginal florets. **Disc florets** regular and deeply 5-lobed or frequently bilabiate, bisexual or functionally male or female. **Anthers** calcarate and caudate; tails often branched (pilose); apical appendage often rather long and coloured, flat; endothecial tissue polarised. **Style** variable; style branches frequently rather short, glabrous to papillose or pilose dorsally and apically; hairs acute or obtuse-rounded; stigmatic areas cover inside of style branches. **Cypselas** oblong-obovoid, sometimes rather slender, often ribbed. **Pappus** of many scabrid to barbellate, sometimes plumose bristles, rarely of scales, or with additional scales.

Genera 74, pantropical, greatest concentration in South America; also in Central America, West Indies, southern North America, tropical and sthn Afr., Madagascar, tropical and East Asia, Hawaiian Islands, Australia; 5 genera and 40 species in sthn Afr.

Cassini: 199 (1819a); Pope: 4 (1992); Bremer: 93 (1994).

Key after Dyer: 660 (1975).

Key to genera

1a Branched perennials, shrublets, or shrubs:
2a Leaves thick, leathery, becoming shiny above, very woolly beneath ..... **Oldenburgia**
2b Leaves herbaceous, often tomentose:
3a Involucre scales mostly pungent, often recurving ..... **Dicoma**
3b Involucre scales obtuse not recurved ..... **Pleiotaxis**
1b Acaulescent, perennial herbs; heads usually radiate on upright, unbranched peduncles:

4a Pappus bristles long and stout, tawny; lamina of marginal florets very short ..... **Perdicium**
4b Pappus bristles slender, short or, if long, then pinkish brown or if stout, then whitish; lamina of ray florets usually evident ..... **Gerbera**

Tribe **Plucheeae**

Herbs or shrubs. **Leaves** alternate or sometimes subopposite, entire, dentate, serrate or lobed to pinnatifid, sometimes clasping or ± decurrent and sometimes forming stem wings; with hairs of type A (multiseptate hairs with short cells). **Capitula** disciform. **Involucral bracts** generally imbricate in several rows, chartaceous or herbaceous. **Receptacle** generally flat, epaleate. **Outer florets** female; corolla filiform, purple, pink, rarely yellow or whitish, 3-lobed. **Central florets** bisexual or functionally male, purple or sometimes yellow or whitish, 4- or 5-lobed. **Anthers** calcarate, caudate or ecaudate; endothecial tissue of elongate cells, radial; filament collar flattened or mamillose. **Style** with oblong-linear, rounded style branches with hairs far down shaft below bifurcation; hairs obtuse or sometimes ± acute; stigmatic areas in 2 apically confluent lines. **Cypselas** ellipsoid, turbinate or triquetrous, glabrous or hairy with straight or uncinate to anchor-shaped twin hairs, sometimes with prominent red-brown resin deposits in wall. **Pappus** of barbellate, capillary bristles in 1 row or of elongated scales, generally free, sometimes forming small ring-shaped cup of scales; rarely 0.

Genera 28, mainly tropical or subtropical, with some in arid areas of South America, Africa, Asia and Australia; 7 genera and 22 species in sthn Afr.

Anderberg: 2293 (1989); Anderberg: 154 (1991c); Anderberg: 296 (1994).

Key to the genera of the Plucheeae and to some other similar genera after Anderberg: 155 (1991c).

Key to genera

1a Pappus bristles 0:
2a Capitula in secondary heads ..... **Sphaeranthus**
2b Capitula not in secondary heads ..... **Litogyne**
1b Pappus bristles present:
3a Cypselas with conspicuous red resin ducts ..... **Doellia**
3b Cypselas without resin ducts:
4a Pappus bristles with patent teeth ..... **Pluchea**
4b Pappus bristles with adpressed teeth:
5a Style with rather pointed sweeping hairs, reaching the furcation ..... **Nicolasia nitens**
5b Style with obtuse sweeping hairs, reaching well below the furcation:
6a Anthers with long, distinct tails ..... **Pseudoconyza**
6b Anthers ecaudate:
7a Stem not winged ..... **Nicolasia costata**
7b Stem winged:
8a Pappus bristles few ..... **Nicolasia**
8b Pappus bristles many ..... **Laggera**

Tribe **Senecioneae**

Herbs, shrubs, subshrubs, trees or vines. **Leaves** alternate or sometimes rosulate, entire to variously serrate-dentate or lobed, pinnately or sometimes palmately veined, rarely succulent. **Capitula** radiate, disciform or discoid, solitary or cymose to corymbose-paniculate. **Involucral bracts** mostly in 1 row, oblong-lanceolate, calyculate (outer row of smaller bracts) or ecalyculate; rarely in 2 subequal rows (biseriate), sometimes connate. **Receptacle** always epaleate and mostly naked. **Ray florets** female, fertile, yellow, white or variously coloured. **Disc florets** bisexual or sometimes functionally male, 5-lobed, yellow, whitish or variously coloured; outer florets in disciform capitula female, tubular or filiform. **Anthers** ecalcarate, ecaudate or sometimes caudate; apical appendage ovate-lanceolate to oblong, flat; endothecial tissue of elongated cells, radial or polarised; filament collar slender or often much dilated with swollen cells. **Style** in bisexual florets with oblong-linear, dorsally glabrous or rarely papillose style branches, apically usually truncate and penicillate, sometimes almost glabrous, sometimes acute to acuminate with sterile appendage and ± fused hairs; hairs obtuse; stigmatic areas in 2 separate lines or partly or wholly continuous ventrally on style branches. **Cypselas** rather uniform, mostly ellipsoid-oblong and ribbed, rarely compressed, glabrous or pubescent with twin hairs, rarely myxogenic. **Pappus** of scabrid-barbellate (never plumose), fine or coarse bristles; bristles rarely reduced and short or 0.

Genera 120, worldwide, especially abundant in Central and South America, tropical and sthn Afr.; 20 genera and 593 species in sthn Afr.

Cassini: 196 (1819a); Bremer: 494 (1994).

Key to the genera of the tribe Senecioneae compiled from descriptions in Bremer (1994) and key by Jeffrey: 874 (1986).

Key to genera

1a Aquatic herbs:
2a Capitula radiate; style undivided; pappus of coarse, rigid, scabrid bristles ..... **Cadiscus**
2b Capitula discoid; style divided; pappus of fine bristles ..... **Emilia**
1b Plants not aquatic:
3a Pappus 0 in all florets:

4a Annual herbs ..... **Steirodiscus**
4b Perennial herbs, shrubs or shrublets ..... **Euryops**
3b Pappus present, at least in ray florets:
5a Involucre calyculate:
6a Anther bases with sterile tailed auricles (caudate):
7a Petiole auriculate, capitula discoid ..... **Delairea**
7b Petioles basally thickened and climbing, exauriculate; capitula disciform ..... **Mikaniopsis**
6b Anther bases ecaudate:
8a Ovary wall crystals simple, plate-like or needle-like or 0:
9a Outer (ray) cypselas dorsiventrally compressed ..... **Cineraria**
9b Outer (ray) cypselas not compressed, or radiate florets 0:
10a Style branch apices not appendaged, truncate or rounded ..... **Senecio**
10b Style branch apices with very short to elongated appendage of fused papillae ..... **Crassocephalum**
8b Ovary wall crystals compound, drusiform:
11a Subsucculent; style branches truncate, sometimes with central tuft of fused papillae ..... **Solanecio**
11b Succulent; style branches with conical to somewhat elongated appendages ..... **Kleinia**
5b Involucre ecalyculate:
12a Capitula radiate with epidermis of ray lamina papillose; anther bases caudate ..... **Phaneroglossa**
12b Capitula discoid, disciform or if radiate, epidermis of ray lamina different; anther bases ecaudate:
13a Capitula discoid:
14a Style branches with continuous stigmatic areas ..... **Lamprocephalus**
14b Style branches with separate stigmatic areas:
15a Style branches linear-obtuse with long, filiform, papillose appendages ..... **Lopholaena**
15b Style branches linear, truncate to obtuse with smaller appendages or appendages 0:
16a Style branches with small appendages:
17a Annual or perennial herbs; involucral bracts free; florets orange, red, pink, purple, violet or white..... **Emilia**
17b Perennial herbs, subshrubs or shrubs; involucral bracts basally connate; florets yellow or whitish..... **Othonna**
16b Style branches without appendages:
18a Florets orange, red, pink, purple, violet or white ..... **Emilia**
18b Florets yellow ..... **Euryops**
13b Capitula radiate or disciform:
19a Capitula disciform:
20a Annual herbs; disc florets bisexual; cypselas compressed; pappus 0 in marginal florets ..... **Stilpnogyne**
20b Perennial herbs, shrublets or shrubs; disc florets functionally male; cypselas ellipsoid to oblong; pappus present:
21a Style of central florets undivided ..... **Othonna**
21b Style of central florets divided, with oblong-linear, obtuse or truncate branches ..... **Hertia**
19b Capitula radiate:
22a Endothecial tissue of anthers polarised ..... **Alciope**
22b Endothecial tissue radial:
23a Annual herbs:
24a Leaves alternate, scattered along stem ..... **Oligothrix**
24b Leaves rosulate:
25a Capitula small, corymbosely arranged on long scapes ..... **Gymnodiscus**
25b Capitula large, solitary on long scapes ..... **Euryops**
23b Perennial herbs, shrublets or shrubs:
26a Disc florets bisexual, rarely functionally male; style bifid, sometimes undivided ..... **Euryops**
26b Disc florets functionally male:
27a Style undivided ..... **Othonna**
27b Style divided ..... **Hertia**

Tribe **Tarchonantheae**

Shrubs or trees, dioecious; often aromatic. **Leaves** alternate, petiolate or subsessile, entire, spinulose-denticulate, coarsely dentate, serrate or 3-lobed at apex, leathery, sometimes pale and tomentose below. **Capitula** discoid, in terminal or axillary panicles. **Involucre** campanulate to elliptic or obconic; involucral bracts in 1–several rows, often imbricate. **Receptacle** epaleate. **Florets** yellowish or whitish. **Male capitula** with 5-lobed, tubular corollas. **Anthers** exserted, calcarate and caudate; endothecial tissue polarised. **Style** filiform, minutely bifid at tips or undivided. **Female capitula** with 3–5-lobed, tubular to filiform corolla, very short in *Tarchonanthus*. **Style** simple, exserted, with short often recurved branches, flattened or blunt near tip. **Cypselas** angled or few-ribbed, pubescent. **Pappus** 0 (*Tarchonanthus*) or of 1 or 2 rows of rough bristles (*Brachylaena*).

Genera 2, *Brachylaena* R.Br. and *Tarchonanthus* L. restricted to Africa, Madagascar and associated islands; both in sthn Afr.

Kosteletzky: 668 (1833); Keeley & Jansen: 179 (1991).

Key to the genera of the tribe Tarchonantheae after Hilliard (1977).

Key to genera

Pappus of scabrid bristles..... **Brachylaena**
Pappus 0..... **Tarchonanthus**

Tribe **Vernonieae**

Herbs, shrubs, small trees or vines. **Leaves** mostly alternate, sometimes rosulate or opposite or verticillate, mostly entire or serrate-dentate only. **Capitula** mostly discoid; very variously arranged, solitary, corymbose, paniculate, scorpioid cymose, clustered, etc. **Involucral bracts** generally imbricate in several rows. **Receptacle** generally epaleate. **Disc florets** bisexual, regular, 5-lobed, often glandular and sometimes pilose; white, pink, violet, blue, red or purple, rarely yellow or orange. **Anthers** calcarate but mostly ecaudate; apical appendage elongate, obtuse-rounded; endothecial tissue polarised. **Style** slender with long, filiform branches, pilose dorsally along style branches and on shaft below; hairs mostly acute. **Cypselas** oblong to obovoid-obconical, often ribbed or angled; frequently sericeous with twin hairs or glabrous, often glandular. **Pappus** of scabrid-barbellate bristles, rarely plumose, or of scales, or a corona, frequently double with outer row of much shorter scales or bristles, sometimes 0.

Genera 98, pantropical, South America, Central and North America, West Indies, tropical and sthn Afr., Madagascar, few in tropical Asia and 1 in N Australia; 7 genera and 51 species in sthn Afr.

Cassini: 203 (1819a); Pope: 56 (1992); Bremer: 212 (1994).

Key to genera

1a Pappus 0, cypsela crowned with apical rim..... ***Ethulia**
1b Pappus of bristles or scales:
2a Pappus of a few, caducous bristles:
3a Leaves alternate, minutely pellucid-dotted; pappus bristles shortly hairy..... **Erlangea**
3b Leaves opposite or whorled, not pellucid-dotted; pappus bristles hispid..... **Bothriocline**
2b Pappus in 2 rows, outer row of short scales or rarely bristles, inner row of many long, serrated bristles:
4a Flowers yellow or orange and/or leaves trinervate..... **Distephanus**
4b Flowers creamy-white, shades of purple or blue; leaves pinnately veined:
5a Pollen without colpi; endothecial tissue with cells thickened on both horizontal and radial walls; filament collars narrowly cylindrical, elongate, straight; style bases conspicuously ring-like..... ***Cyanthillium**
5b Pollen with colpi; endothecial tissue polarised; filament collars and style bases different:
6a Inner involucral bracts with membranous and frequently coloured, spreading appendages; style bases surrounded by long keeled nectaries..... **Baccharoides**
6b Inner involucral bracts without appendages; style bases different..... **Vernonia**

***Acanthospermum** Schrank 9130000

(Heliantheae)
Schrank: t. 53 (1820); Candolle: 5 (1836); Phillips: 812 (1951); Wild: 5 (1967); Hilliard: 292 (1977); Karis & Ryding: 609 (1994).

Erect or prostrate, annual herbs. **Leaves** opposite, sessile or petiolate, simple, margins dentate or pinnatisect. **Capitula** radiate; solitary, sessile or pedunculate, in leaf axils or forks of branches. **Involucre** in 2 rows; outer bracts herbaceous, inner enlarging in fruit, indurate, spiny, enveloping cypselas of ray florets. **Receptacle** conical, paleate. **Ray florets** 5–8, female fertile; corolla yellow, shortly strap-shaped. **Style** branches linear, obtuse. **Cypselas** oblong, smooth, tightly enveloped in one of the involucral bracts. **Pappus** 0. **Disc florets** bisexual, functionally male; corolla yellow, usually campanulate with narrow tube, 5-toothed. **Anthers** with obtuse bases, apical appendage present. **Style** undivided, somewhat clavate. **Ovary** of disc florets abortive. $x = 10, 11$.

Species 6, Central and South America; 3 naturalised in sthn Afr., widespread, absent from Northern and Western Cape.

***Achillea** L. 9332000

(Anthemideae)
Linnaeus: 896 (1753); Linnaeus: 382 (1754); Hilliard: 344 (1977); Bremer & Humphries: 128 (1993); Bremer: 462 (1994).

Perennial herbs, usually hairy, sometimes aromatic. **Leaves** alternate, usually pinnatisect. **Capitula** radiate, small, in corymbs. **Involucre** ovoid or campanulate, rarely subglobose; bracts in few rows, outer shorter than inner, margins scarious. **Receptacle** nearly flat, convex or elongated, paleate. **Ray florets** female, fertile; corolla strap-shaped, usually short and broad; tube ± flattened; white, yellow or rosy. **Disc florets** bisexual, fertile, white or yellow; tube usually compressed, 2-winged below, dilated above, 5-toothed. **Anthers** ecalcarate and ecaudate, with ovate apical appendage. **Style** branches linear, truncate, penicillate. **Cypselas** oblong or obovate, strongly compressed, with 2 lateral ribs. **Pappus** 0. $x = 9$ (aneuploids, high polyploidy, B-chromosomes).

Species 115, Europe, Asia, Africa, North America, Australia and New Zealand; 1 naturalised as weed in sthn Afr.: **Achillea millefolium* L., Botswana, Gauteng, Mpumalanga, KwaZulu-Natal and Eastern Cape.

Adenanthellum B.Nord. 9341050

(Anthemideae)
Nordenstam: 160 (1979); Bremer & Humphries: 145 (1993); Bremer: 470 (1994).

Adenanthemum B.Nord. not of Conw.; Nordenstam: 157 (1976).

Perennial herbs. **Leaves** alternate, sessile, lanceolate-ovate-elliptic, flat, herbaceous, pubescent-glabrescent, with serrate margins. **Capitula** radiate, terminal, solitary or laxly corymbose on ± distinctly pedunculoid branch ends. **Involucre** broadly campanulate; involucral bracts imbricate, lanceolate-oblong-narrowly obovate, herba-

ceous, acute, with membranous margins and tips. **Receptacle** somewhat convex, epaleate. **Ray florets** many, female, fertile, white, without distinct tube; lamina apically bifid or subentire, with densely colliculate upper surface and glandular smooth lower surface, confluent with cypsela. **Disc florets** many, bisexual, yellow; corolla tubular ± regular, 5-lobed, glandular, confluent with cypsela. **Anthers** ecalcarate and ecaudate, with broadly ovate-oblong obtuse-rounded appendage; endothecial cells with many thickenings on vertical walls; filament collar oblong, of subequal cells. **Style** fertile with truncate branches; style base swollen, placed on top of and partly immersed in short and broad nectary. **Cypselas** oblong, somewhat compressed with 10 ribs, 10 veins and 10 associated resin ducts, glandular. **Pappus** 0.

Monotypic: *Adenanthellum osmitoides* (Harv.) B.Nord.; endemic to sthn Afr., Mpumalanga, Swaziland and N KwaZulu-Natal.

Adenoglossa B.Nord. 9341010

(Anthemideae)

Nordenstam: 137 (1976); Bremer & Humphries: 157 (1993); Bremer: 472 (1994).

Erect annual herbs. **Leaves** opposite or alternate, narrowly linear, entire, fleshy, semiterete or subterete. **Capitula** radiate, terminal, solitary, pedunculate. **Involucre** broadly campanulate-hemispherical; involucral bracts imbricate, broad and rounded, herbaceous. **Receptacle** conical, epaleate. **Ray florets** female, fertile, few, yellow; tube short, somewhat compressed, sparsely glandular; lamina short, oblong-obovate, usually reflexed, glabrous, 3-fid at apex. **Style** branches oblong, truncate. **Disc florets** bisexual; corolla yellow, irregular, 5-lobed; limb campanulate; tube somewhat compressed, glandular. **Anthers** ecalcarate and ecaudate; apical appendage ovate, obtuse, with distinct orange-yellow resin gland; endothecial tissue partly polarised; filament collar oblong-cylindric, of subequal cells. **Style** fertile with truncate branches; base distinctly swollen, placed on top of narrower, conical-oblong, distinct nectary. **Cypselas** dorsiventrally compressed and laterally winged, adaxially smooth, abaxially with closely set longitudinal striae, ending in hair-like apical projections and becoming mucilaginous when soaked; wings hyaline, apically auriculate. **Pappus** of 5 or 6 scales.

Monotypic: *Adenoglossa decurrens* (Hutch.) B.Nord.; endemic to sthn Afr., Northern Cape (Richtersveld).

Adenostemma J.R. & G.Forst. 8785000

(Eupatorieae)

Forster & Forster: 89 (1776); Harvey: 57 (1865); Oliver & Hiern: 299 (1877); Phillips: 777 (1951); Cufodontis: 1079 (1966); Merxmüller: 19 (1967a); Hilliard: 47 (1977); Bremer *et al.*: 648 (1994).

Perennial herbs, glandular-pilose or glabrous. **Leaves** opposite, dentate or subentire. **Capitula** discoid; many-flowered, pedunculate, in lax corymbose panicles. **Involucre** campanulate; bracts in ± 2 rows, ± connate at base. **Receptacle** honeycombed, epaleate. **Corolla** white or mauve; tubular, widening gradually upwards; lobes 5, shorter than tube, glandular-hairy. **Anthers** linear, blunt at base; with or without small, apical appendage. **Style** branches long, dilated above, obtuse, sometimes subpetaloid, papillose on outer surface. **Cypselas** 3- or 5-angled. **Pappus** of 3 or 5 short, rigid gland-tipped processes. $x = 10$.

Species 24, South and Central America, West Indies, Africa, Asia, Pacific Islands; 2 in sthn Afr.: *Adenostemma caffrum* DC. widespread but not known from the Western Cape and *A. viscosum* J.R.Forst. & G.Forst., occurring in the Northern Province, Mpumalanga, KwaZulu-Natal and Eastern Cape.

*Ageratina Spach 8816030

(Eupatorieae)

Spach: 286 (1841); King & Robinson: 211 (1970a); Bremer *et al.*: 644 (1994).

Eupatorium L.: 836 (1753) in part; Hilliard: 52 (1977).

Annual or perennial herbs or shrubs. **Leaves** opposite, alternate or sometimes whorled. **Capitula** discoid; few- to many-flowered, in dense corymb or occasionally paniculate. **Involucre** tubular; bracts in 1–many rows. **Receptacle** flat, epaleate. **Corolla** purple, blue or white; tubular and scarcely widened upwards, or cylindric below, campanulate above; lobes 4 or 5, much shorter than tube. **Anthers** obtuse at base. **Style branches** filiform, obtuse, papillose outside. **Cypselas** prismatic or fusiform, setose and/or glandular. **Pappus** of many scabrid, usually deciduous bristles. $x = 17$ (aneuploids, B-chromosomes, polyploidy).

Species ± 290, America; 3 naturalised in sthn Afr., Gauteng, KwaZulu-Natal and Western Cape.

*Ageratum L. 8795000

(Eupatorieae)

Linnaeus: 839 (1753); Linnaeus: 363 (1754); Harvey: 57 (1865); Oliver & Hiern: 300 (1877); Phillips: 777 (1951); Johnson: 13 (1971); Hilliard: 50 (1977); Bremer *et al.*: 649 (1994).

Annual or perennial herbs or subshrubs. **Leaves** opposite or upper alternate, entire or dentate, with large glandular spots on lower surface. **Capitula** discoid; many-flowered, in dense corymbs or occasionally a lax panicle. **Involucre** campanulate; bracts in 2 or 3 rows, free, ribbed, with membranous margins. **Receptacle** honeycombed, conical, naked or paleate. **Corolla** purple, blue or white; tube cylindric below, campanulate above; lobes 5, much shorter than tube, glandular. **Anthers** obtuse at base, with oblong, apical appendage. **Style** terete, with short glandular branches. **Cypselas** 4- or 5-ribbed, glabrous or short-setose on ribs; carpopodium usually large and asymmetrical. **Pappus** coroniform, of 5 or 6 free scales or awns or 0. $x = 10$ (aneuploids, polyploidy).

Species 44, all natives of Central and South America, the West Indies; 2 naturalised in sthn Afr.: **Ageratum conyzoides* L. occurring in the Northern Province and Mpumalanga, and **A. houstonianum* Mill., known from KwaZulu-Natal and Eastern Cape.

Alatoseta Compton 9090010

(Gnaphalieae)

Compton: 314 (1931); Anderberg: 46 (1991a); Anderberg: 321 (1994).

Annual herbs. **Stems** spreading, slender, stiff, softly hairy. **Leaves** alternate, sessile, narrowly linear, inrolled, entire margins, glandular-hairy, mucronate and pungent. **Capitula** radiate; solitary, terminal. **Involucre**: bracts in several rows; outer bracts narrowly winged, rough, pungent, spreading or reflexed; inner narrow, margin papery. **Receptacle** flat, with many, narrow paleae among the florets. **Ray florets** female, in one row, fewer than disc florets; corolla purple; tube short; lamina narrowly ovate. **Cypselas** short, hairy. **Pappus** of five rigid, scale-like awns with two flattened basal wings. **Disc florets** bisexual; corolla yellow; tube with a fold below the middle; lobes 5, erect. **Anthers** minutely appendiculate. **Style** branches long, semiterete, obtuse with a sterile; apical appendage and hairs dorsally, with longer hairs below the apex. **Cypselas** similar to those of ray florets, but vestigial and glabrous. **Pappus** a short rim.

Monotypic, endemic in sthn Afr.: *Alatoseta tenuis* Compton is known from the Northern and Western Cape.

Alciope DC. 9391000

(Senecioneae)

Candolle: 209 (1836a); Harvey: 60 (1865); Bremer: 512 (1994).

Perennial herbs, woolly. **Leaves** alternate, shortly petiolate, elliptic or ovate, sometimes toothed, white-woolly beneath, tomentose-glabrescent above. **Capitula** radiate, solitary or laxly corymbose, pedunculate, many-flowered. **Involucre** ecalyculate, campanulate; bracts in 2 rows, leathery, ciliate above, woolly on back. **Receptacle** flat, epaleate. **Ray florets** female, corolla yellow; tube with linear to linear-oblong, 3-toothed lamina up to two and a half times its length. **Staminodes** sometimes present. **Disc florets** bisexual, fertile, corolla tube widened above, with 5 linear-lanceolate lobes. **Anthers** ecalcarate and ecaudate or shortly sagittate at base, with lanceolate, apical appendage; endothecial tissue polarised. **Style** terete, thickened at base; branches linear, obtuse; stigmatic areas continuous. **Cypselas** oblong, pubescent. **Pappus** of many fine bristles.

Species 2, *Alciope lanata* (Thunb.) DC. and *A. tabularis* (Thunb.) DC., endemic to sthn Afr., Western Cape.

*Ambrosia L. 9146000

(Heliantheae)

Linnaeus: 987 (1753); Linnaeus: 425 (1754); Oliver & Hiern: 370 (1877); Phillips: 813 (1951); Wild: 2 (1967); Hilliard: 295 (1977); Karis & Ryding: 621 (1994).

Annual or perennial herbs, sometimes shrubby, monoecious. **Leaves** usually alternate, petiolate, simple, lobed or pinnately dissected, margins entire. **Capitula** unisexual. **Male capitula** in leafless spikes or racemes, usually drooping, hyaline, many-flowered. **Involucre** cup-shaped; bracts connate. **Receptacle** with filiform paleae or epaleate. **Corolla** tubular, campanulate above, 5-lobed. **Anthers** ± free, with incurved, linear apical appendage, base entire. **Style** undivided, truncate, penicillate. **Ovary** abortive. **Female capitula** sessile, solitary or clustered in upper leaf axils below males, 1-flowered. **Involucre** enveloping cypsela and becoming indurated, turbinate, with 4–6 spines on shoulder below neck through which long, linear, papillose style branches exserted. **Corolla** 0. **Cypselas** ovoid, smooth. **Pappus** 0. $x = 9$ (8) (aneuploids, high polyploidy).

Species 43, North and South America; 3 naturalised in sthn Afr., known from North-West, Gauteng, Mpumalanga, Free State, KwaZulu-Natal, Lesotho, Eastern Cape.

Amellus L. 8887000

(Astereae)

Linnaeus: 1225 (1759); Harvey: 61 (1865); Merxmüller: 20 (1967a); Rommel: 584 (1977); Bremer: 410 (1994).

Susanna E.Phillips: 17 (1950)

Annual or perennial herbs or small subshrubs, branched, thickly hairy. **Leaves** alternate or sometimes lower ones opposite, entire or toothed, linear to oblanceolate or spathulate, subsessile, both sides strigillose or canescent. **Capitula** radiate, disciform or discoid, solitary, on axillary or terminal, rarely bracteate peduncles. **Involucre** hemispherical to campanulate; bracts imbricate, in 2–7 rows, with membranous margins, tomentose or pilose. **Receptacle** with linear or linear-lanceolate or club-shaped paleae, or epaleate. **Ray florets** sometimes reduced or 0, female, in 1 row; corolla blue, purple or white; tube cylindric, glandular below, produced into oblong, 3-toothed lamina. **Style** with 2 long branches. **Staminodia** sometimes present. **Disc florets** bisexual and fertile; corolla yellow or white, sometimes flushed reddish purple; tube cylindric below, expanded above or tube expanded from base, 5-lobed, laxly glandular. **Style** branches with narrowly to broadly triangular appendages. **Anthers** ecalcarate and ecaudate, with long triangular, apical appendage. **Cypselas** obovate, with 2 or more marginal veins, light brown, greyish white or white, hairy; cypselas of ray florets often glabrescent and hairy only on margins. **Pappus** almost always consisting of a row of caducous, barbellate bristles and a row of persistent scales. $x = 8$ (6, 9).

Species 12; sthn Afr.; Namibia, Botswana, Free State, Northern, Western and Eastern Cape.

Amphiglossa DC. 9046000

(Gnaphalieae)

Candolle: 258 (1838a); Harvey: 275 (1865); Bentham: 324 (1873a); Anderberg: 78 (1991a); Anderberg: 330 (1994); Koekemoer: 65 (1999).

Pterotlirix DC.: 279 (1838a).

Perennial, woody, much branched, wiry shrubs or dwarf-shrubs, erect or decumbent, *Amphiglossa callunoides* DC. stoloniferous and *A. corrudifolia* DC. rhizomatous. **Branches** glabrous or with a thin layer of arachnoid hairs, tips spinescent in *A. triflora* DC. **Leaves** small, ericoid, imbricate or widely spaced, in fascicles in some species, sessile or inconspicuously stalked, involute, abaxial surface arachnoid or glabrous, adaxial surface woolly, margins smooth, tips mucronate, acute or rounded. **Capitula** radiate or discoid, terminal, sessile, solitary or in small groups, 3–12-flowered. **Involucral bracts** in several rows; outermost chaffy or foliaceous; innermost chaffy, longer and narrower than outermost. **Receptacle** a small disc, nude or with small extensions around cypsela bases. **Ray florets** present in some species, white or pink, female, as long as wide or strap-shaped, to 3.5 mm long, 1.8 mm wide. **Disc florets** white or pink, tubular, bisexual, 5-lobed. **Anthers** apically acuminate, basally tailed. **Style** bifid, stigmatic area in two strips along margins of style branches, inflated cells at branch tips short, rounded. **Nectary** a small disk between style base and cypsela, present in all flowers. **Cypselas** small, asymmetrical, glabrous, papillate. **Pappus** bristles 18–32, densely plumose from tip to base, in one row, free (or fused only at very base in *A. celans* Koekemoer).

Species 11, endemic to sthn Afr.: *Amphiglossa triflora* DC. widespread in Namibia, North-West, Gauteng, Mpumalanga, Free State, Lesotho, Northern, Western and Eastern Cape; *Amphiglossa tomentosa* (Thunb.) Harv. in Namibia, Northern and Western Cape; the other species have localised distributions in Namibia, North-West, Northern, Western and Eastern Cape.

Anaxeton Gaertn. 8998000

(Gnaphalieae)

Gaertner: 406 (1791); Harvey: 289 (1865); Lundgren: 22 (1972); Anderberg: 92 (1991a); Anderberg: 335 (1994).

Shrublets, usually woolly. **Leaves** alternate, linear to elliptic, sessile, usually crowded and with revolute, entire margins and pungent apex, tomentose (hair type B). **Capitula** disciform, aggregated in dense corymbs at end of long peduncles (corymbophore), rarely sessile. **Involucre** ± ellipsoid; bracts in 4–6 rows, outer pilose or hairy at base; inner with white or reddish, petaloid appendage; stereome undivided. **Receptacle** epaleate, flat or somewhat convex, smooth. **Female florets** few; corolla purple, tubular or filiform, sparsely glandular, 5-toothed. **Disc florets** functionally male, outnumbering female florets; corolla purple, tubular below, narrowly campanulate above, with 5 short, ovate lobes. **Anthers** ecalcarate, caudate, with short tails, with ovate, apical

appendage; endothecial tissue polarised. **Style** branches flattened, linear, truncate with obtuse sweeping hairs apically. **Cypselas** narrowly oblong to narrowly elliptic to narrowly ovate, glabrous or pubescent with elongated, nonmyxogenic twin hairs (glandular hairs present in some species). **Pappus** barbellate to subplumose, free at base or basally fused into annulus, reduced in female florets.

Species 10, endemic to sthn Afr., Western Cape.

Anderbergia B.Nord. 8998010

(Gnaphalieae)
Nordenstam: 407 (1996).

Erect or diffuse shrublets without stolons, with greyish whitish tomentum. **Leaves** alternate, sessile, simple, entire, tomentose, eglandular, with revolute margins. **Capitula** disciform, small, in terminal dense corymbs. **Involucral bracts** dimorphic, ± tomentose, with undivided stereome; outer involucral bracts narrowly linear to oblong or spathulate with membranous brown distal portion; inner involucral bracts unguiculate with linear-oblong, ± tomentose claw and white opaque, glabrous, petaloid apical portion. **Receptacle** epaleate. **Female florets** (0)1 or 2; corolla white or yellowish, shortly lobed. **Style** bifurcate. **Cypsela** ellipsoid-oblong, glabrous or shortly hirsute with papilliform nonmyxogenic twin hairs, rarely also sparsely setose with longer narrower hairs. **Ovary wall** crystals prismatic (rectangular, hexa- or octagonal), homomorphic or heteromorphic. **Pappus** bristles uniseriate, basally shortly connate or nearly discrete, without patent cilia, barbellate throughout with usually short acute to obtuse teeth. Functionally **male florets** few (3–6); corolla white or yellow, tubular below, with campanulate 5-lobed limb; lobes erect to spreading, with marginal veins reaching lobe apex. **Anthers** with basal tails and apical flat ± ovate-triangular appendage; endothecium polarised; filament collar elongate, straight. **Style** sterile, simple with subclavate or truncate tip, sometimes minutely bifid, with obtuse, short sweeping hairs; stylophore distinct, broader than style. **Ovary** aborted, glabrous, 2-veined. **Pappus** bristles uniseriate, basally shortly connate or almost discrete, without patent cilia, barbellate throughout with acute to obtuse or subclavate teeth.

Species 6, endemic to sthn Afr., Western Cape.

Anisochaeta DC. 9068000

(Gnaphalieae)
Candolle: 109 (1836a); Harvey: 57 (1865); Hilliard: 278 (1977); Anderberg: 47 (1991a); Anderberg: 323 (1994).

Scandent shrubs, sometimes wide-climbing. **Leaves** alternate, petiolate, broadly ovate, coarsely incised-dentate to repand. **Capitula** discoid, pedunculate, small, in divaricately branched panicles. **Involucre** campanulate; bracts in 5 rows, imbricate; stereome undivided. **Receptacle** epaleate, honeycombed. **Disc florets** bisexual, fertile; corolla white or creamy white, tubular below with 5 long, narrow lobes equalling tube. **Anthers** calcarate, caudate, with lanceolate, apical appendage; endothecial tissue polarised. **Style** branches obtuse, dorsally with obtuse sweeping hairs not reaching furcation; stigmatic surfaces basally separated but apically confluent. **Cypselas** 4- or 5-angled, glandular. **Pappus** of elongated scale-like awns.

Monotypic: *Anisochaeta mikanioides* DC., endemic to sthn Afr., KwaZulu-Natal and Eastern Cape.

Anisopappus Hook. & Arn. 9096000

(Inuleae)
Hooker & Arnott: 196 (1837); Oliver & Hiern: 369 (1877); Phillips: 811 (1951); Hilliard: 288 (1977); Wild: 48 (1964); Wild: 80 (1982); Anderberg: 283 (1994).

Eenia Hiern & S.Moore: 373 (1899).

Annual or perennial herbs, rarely shrubs, hairy and glandular. **Leaves** alternate, petiolate, usually toothed, simple, lobed or pinnatipartite, rarely linear. **Capitula** radiate or discoid, several-flowered, in lax or dense, terminal corymbs. **Involucre** campanulate or hemispherical; bracts in 3–5 rows, lanceolate or oblong, variously hairy and glandular outside. **Receptacle** flat, paleate; paleae ciliate, ± enfolding disc florets. **Ray florets** female; in 1 row; corolla yellow, tube oblong or elliptic, 3- or 4-toothed, lamina ± as long as tube; ovary ellipsoid or linear-oblong, somewhat ribbed. **Disc florets** bisexual; corolla dull yellow, tube constricted in lower half or rarely widening gradually upwards, lower part of tube usually glandular, upper part usually glabrous; lobes 5, ovate. **Anthers** tailed, apical appendage lanceolate. **Style** terete; branches flat, linear, obtuse, papillose outside toward blunt apices. **Cypselas** ellipsoid or subcylindric, often ribbed, usually hairy. **Pappus** of linear, lanceolate or broad scales with longer, narrower scales interspersed; or scales equal; or 0 or cypsela crowned by shallow rim. $x = 7$ (polyploidy).

Species 32, southern and tropical Africa, Madagascar, China; 5 in sthn Afr., known from Namibia, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Anisothrix O.Hoffm. 9072000

(Gnaphalieae)
Hoffmann: 129 (1898); Anderberg: 363 (1988); Anderberg: 46 (1991a); Anderberg: 323 (1994).

Shrublets or shrubs, glabrous. **Leaves** alternate, sessile, small, glabrous or with scattered glandular hairs, margins entire or dentate to almost pinnatifid. **Capitula** discoid, solitary, terminal. **Involucre** cyathiform to slightly campanulate; bracts in many rows, imbricate; stereome undivided. **Receptacle** flat, epaleate. **Disc florets** bisexual and fertile; corolla yellow; tube with narrow, cylindric, 5-lobed limb; lobes strongly retrofract when dry; glandular-hairy or glabrous. **Anthers** ecalcarate, caudate; apical appendage acute, flat; endothecial tissue polarised. **Style** bifid; style branches obtuse with obtuse sweeping hairs dorsally, not reaching furcation; stigmatic surface basally separated but apically confluent. **Cypselas** cylindric, terete, sparsely to moderately hairy with elongated twin hairs. **Pappus** of few, free barbellate bristles in 1 row and outer row of narrow scales. $x = 7$.

Species 2: *Anisothrix integra* (Compton) Anderb. and *A. kuntzei* O.Hoffm., endemic to sthn Afr., Western Cape; rare.

*__Anthemis__ L. 9330000

(Anthemideae)
Linnaeus: 893 (1753); Linnaeus: 381 (1754); Henderson & Anderson: 318 (1966); Hilliard: 343 (1977); Bremer & Humphries: 132 (1993); Bremer: 464 (1994).

Annual or perennial herbs, often with unpleasant smell, hairy or glabrous. **Leaves** alternate, incise-dentate, pinnatifid or pinnatisect. **Capitula** radiate, medium to large, usually solitary and pedunculate, terminal, rarely laxly corymbose. **Involucre** hemispherical, bracts in several rows, outer shorter than inner, margins scarious. **Receptacle** flat to convex, finally conical or oblong, paleate, paleae scarious and oblong or subulate, truncate to acute to acuminate. **Ray florets** female, fertile or neuter; co-

rolla white or rarely yellow, strap-shaped. **Disc florets** bisexual, yellow; tube ± compressed, sometimes 2-winged, sometimes investing top of ovary, usually dilated above, 5-toothed. **Anthers** ecalcarate and ecaudate, with ovate apical appendage. **Style** branches linear, truncate, penicillate. **Cypselas** oblong, turbinate, 4- or 5-angled, 8–10-ribbed or multistriate. **Pappus** 0, or sometimes of minute scales or minutely coroniform. $x = 9$ (7, 8) (aneuploids, polyploidy).

Species 211, Europe, Asia, Africa, North America, Australia and New Zealand; 2 naturalised in sthn Afr.: **Anthemis arvensis* L., only in KwaZulu-Natal, and **A. cotula* L., in North-West, Gauteng, Mpumalanga, KwaZulu-Natal, Western and Eastern Cape.

Antiphiona Merxm. 9065010

(Inuleae)

Merxmüller: 431 (1954a); Merxmüller: 24 (1967a); Anderberg: 107 (1991b); Anderberg: 284 (1994).

Previously under *Iphiona* Cass.

Shrubs or shrublets, glandular. **Leaves** alternate, pinnatisect or bi- to tripinnatisect. **Capitula** discoid, single, several, or panicled at ends of branches. **Involucre** obconic, 8–10 mm long; bracts in several rows, imbricate, linear-lanceolate, inner ones ciliate towards apex. **Receptacle** smooth, epaleate. **Disc florets** bisexual, tubular; corolla yellow turning purple; lobes shortly ciliate and glandular at apex. **Anthers** minutely calcarate, caudate, with long tails; endothecial tissue polarised. **Style** branches with acute sweeping hairs not reaching furcation. **Cypselas** ellipsoid, with dense, adpressed, silky hairs. **Pappus** of many yellowish, barbellate bristles.

Species 2: *Antiphiona fragrans* (Merxm.) Merxm. and *A. pinnatisecta* (S.Moore) Merxm., endemic to sthn Afr.: Namibia.

Antithrixia DC. 9056000

(Gnaphalieae)

Candolle: 277 (1838a); Harvey: 293 (1865); Bremer: 449 (1978b); Anderberg: 65 (1991a); Anderberg: 330 (1994).

Perennial shrublets with young branches cobwebby. **Leaves** in fascicles, alternate or decussate, linear, sessile, involute, adaxially tomentose, apically mucronate, margins entire. **Capitula** radiate, solitary, terminal, many-flowered. **Involucral bracts** imbricate, linear-oblong, scarious. **Receptacle** flat, epaleate. **Ray florets** female, fewer than disc florets, yellow with purple bands dorsally, cypsela and pappus as in disc florets. **Disc florets** bisexual, corolla tube cylindrical, 5-toothed, yellow, lobes erect. **Anthers** ecalcarate, with short tails. **Style** bifid, branches truncate with obtuse sweeping hairs apically, stigmatic surface separated. **Cypselas** rod-like, with 10 vascular bundles, glabrous or with a few scattered twin hairs. **Pappus** of rigid, subscabrid bristles in 1 row, sometimes connate at base.

Monotypic: *Antithrixia flavicoma* DC., endemic to Namaqualand (Western Cape).

Arctotheca Wendl. 9432020

(Arctoteae)

Wendland: 41 (1798); Beauverd: 51 (1915); Lewin: 48 (1922); Phillips: 844 (1951); Hilliard: 541 (1977); Pope: 235 (1992); Bremer: 258 (1994).

Cryptostemma R.Br.: 141 (1813). *Microstephium* Less.: 92 (1831).

Perennial herbs, rosulate or stems creeping or decumbent. **Leaves** alternate, petiolate, lyrate-pinnatifid, rarely undivided, whitish woolly beneath. **Capitula** radiate, many-flowered, solitary, peduncled, terminal or axillary. **Involucre** campanulate; bracts in many rows, imbricate, margins scarious. **Receptacle** flat, honeycombed. **Ray florets** neuter; corolla yellow, lamina strap-shaped, ± obovate-oblong, 3-toothed; tube flattened; staminodes sometimes present. **Disc florets** bisexual; corolla yellow; tube funnel-shaped, with 5 lanceolate lobes sometimes with process at back of apex; ovary ± obovoid or cylindric. **Anthers** linear, sagittate at base, with ovate appendage. **Style** terete, thickened above, sometimes intruse or with collar at base of cylindric portion, 2-fid. **Cypselas** obovoid, thinly ribbed, densely to laxly villous or occasionally glabrous. **Pappus** of small hyaline, ciliate scales, or crown of membranous scales, or 0. $x = 9$.

Species 4, Mozambique and sthn Afr., known from the North-West, Free State, KwaZulu-Natal, Northern, Western and Eastern Cape.

Arctotis L. 9432000

(Arctoteae)

Linnaeus: 922 (1753); Harvey: 448 (1865); Lewin: 54 (1922); Bremer: 258 (1994).

Annual or perennial herbs, sometimes almost stemless, or subshrubs, ± canotomentose or glandular. **Leaves** alternate, sessile or petiolate, entire to lobed-pinnatisect. **Capitula** radiate, solitary, pedunculate, many-flowered. **Involucre** campanulate; bracts in 5 or 6 rows, ovate to linear, acuminate or with foliaceous apex and often with membranous margin, sometimes ciliate. **Receptacle** flat, honeycombed, margins of pits extended into linear processes. **Ray florets** female; corolla white, cream, yellow, orange, pink, purple, violet or bluish; tube compressed, oblong-linear, with linear, 3-toothed lamina up to 6 × longer than tube. **Staminodes** often present. **Style** linear or terete, often swollen globose at base, thickened above, with ± elliptic-lanceolate branches. **Disc florets** bisexual, fertile or female-sterile; corolla yellow or dark coloured; tube abruptly widened above, with 5 lanceolate, usually glandular lobes. **Anthers** calcarate, shortly caudate, with ovate apical appendage; endothecial tissue radial. **Style** terete, with ring at base and thickened above, shortly bifid. **Cypselas** obovoid-conical, ventrally smooth or rugose and without ribs, dorsally with 3–5 strong ribs or wings sometimes forming 2 dorsal furrows or concavities at maturity, sericeous or pilose or glabrous, often with basal tuft of long hairs. **Pappus** of 1 or 2 rows of large or small scales as long as corolla tube, sometimes 0. $x = 9$.

Species ± 64, sthn Afr. and Angola; ± 64 in sthn Afr.; mostly Eastern and Western Cape and Namaqualand, a few species more widespread, absent from Swaziland.

Arrowsmithia DC. 9058000

(Gnaphalieae)

Candolle: 254 (1838b); Harvey: 524 (1865); Hilliard & Burtt: 230 (1985); Anderberg: 51 (1991a); Anderberg: 323 (1994).

Shrublets, somewhat ericoid, up to 0.6 m high. **Leaves** alternate, sessile, crowded, ovate, with entire, flat to somewhat revolute margins, pungent, glabrous on upper side, hairy on lower (hair type B) and glandular-hairy. **Capitula** radiate, sessile, 1–3-nate at end of branches. **Involucre** subglobose; bracts in ± 7 rows, oblong to oblong-linear, main veins fading well below tips of bracts, with large, membranous, elliptic-obtuse, apical appendage; stereome undivided. **Receptacle** slightly convex, epaleate. **Ray florets** female, in 1 row; corolla yellow; tube with minutely 3-toothed, obovate-elliptic, villous lamina longer than tube. **Cypselas** with 20 ribs. **Disc florets** functionally male; corolla yellow, tube widened above, glandular, villous, with 5 short, ovate lobes. **Anthers** ecalcarate, caudate, with short tails; endothecial tissue polarised; apical appendage ovate, acute. **Style** bifid; style branches obtuse, dorsally with obtuse

sweeping hairs, not reaching furcation; stigmatic surface basally separated but apically converging. **Cypselas** with 12 ribs, glabrous or with scattered, elongated twin hairs, glandular-hairy. **Pappus** of barbellate, caducous bristles shorter than corolla tube, in 1 row.

Monotypic: *Arrowsmithia styphelioides* DC., endemic to sthn Afr., Eastern Cape.

Artemisia L. 9358000

(Anthemideae)

Linnaeus: 845 (1753); Linnaeus: 367 (1754); Harvey: 169 (1865); Tutin, Persson & Gutermann: 178 (1976); Hilliard: 360 (1977); Bremer & Humphries: 120 (1993); Bremer: 458 (1994).

Perennial herbs or subshrubs, aromatic, often canescent. **Leaves** alternate, incised or variously pinnately dissected. **Capitula** disciform, small, mainly pendulous, in racemose panicles, few-flowered. **Involucre** ovoid or broadly campanulate; bracts in few rows with scarious margins. **Receptacle** flat, convex or hemispherical, epaleate, sometimes pilose. **Marginal florets** female, fertile; corolla narrowly tubular, sometimes swollen below, 2- or 3-toothed. **Disc florets** bisexual, fertile or functionally male; corolla yellow, cylindric, sometimes narrowed or swollen at base, sometimes dilated above, 5-lobed. **Anthers** ecalcarate and ecaudate or minutely pointed at base; apical appendage deltoid, sometimes subulate-acuminate. **Style** of female florets linear, truncate, penicillate; of bisexual florets linear or linear-spathulate, usually penicillate; undivided in functionally male florets. **Cypselas** subglobose, smooth, 2-ribbed or multistriate, thin-walled, occasionally hairy. **Pappus** 0. $x = 9$ (8, 13, 17) (aneuploids, high polyploidy, B-chromosomes).

Species 388, mainly northern hemisphere but few species in South America, Africa and Hawaiian Islands; 2 in sthn Afr.: *Artemisia afra* Jacq. ex Willd. (indigenous) and **A. vulgaris* L. (naturalised), widespread but absent from Northern Cape.

Artemisiopsis S.Moore 8973000

(Gnaphalieae)

Moore: 331, t. 8 (1902); Merxmüller: 28 (1967a); Anderberg: 55 (1991a); Anderberg: 323 (1994).

Annual herbs. **Leaves** alternate, linear, sessile, mucronate, woolly hairy (hair type B) and glandular-hairy, margin flat, dentate. **Capitula** disciform, few together in small clusters. **Involucral bracts** in few rows, cartilaginous, woolly hairy; stereome divided. **Receptacle** flat, epaleate. **Female florets** yellow, filiform, in several rows, more than disc florets. **Disc florets** bisexual; corolla yellow, tubular; lobes erect. **Anthers** ecalcarate, caudate; endothecial tissue polarised; apical appendage flat, narrower than thecae. **Style** bifid; style branches truncate with apical tuft of obtuse sweeping hairs; stigmatic surface separated. **Cypselas** basally sparsely hairy with elongated, not myxogenic twin hairs, glandular-hairy; epidermis smooth. **Pappus** of few free, barbellate, capillary bristles in 1 row with outer row of narrow, fused scales; basally without patent cilia.

Monotypic: *Artemisiopsis villosa* (O.Hoffm.) Schweick.; tropical and sthn Afr., Namibia, Botswana and Northern Province.

Aspilia Thouars 9195000

(Heliantheae)

Thouars: 12 (1806); Oliver & Hiern: 378 (1877); Wild: 199 (1966); Phillips: 816 (1951); Hilliard: 393 (1977).

Wedelia Jacq. in part, Karis & Ryding: 600 (1994).

Annual or perennial herbs, erect or prostrate. **Leaves** opposite, simple, entire or toothed. **Capitula** radiate, terminal and solitary, in lax cymes, or ± sessile in condensed corymbs in upper leaf axils. **Involucre** ovoid, campanulate or hemispherical; bracts in 2 or 3 rows, the outer herbaceous. **Receptacle** convex or somewhat conical, paleate; paleae conduplicate, enfolding disc florets. **Ray florets** neuter or female, sterile; corolla strap-shaped, patent, conspicuous, orange, yellow, white, lilac or various shades of purple. **Disc florets** bisexual, fertile; corolla same colour as ray florets, tubular, dilated above, 5-fid. **Anthers** with base obtuse or very shortly saggitate; apical appendage triangular. **Style branches** narrowly oblong with subulate apical appendage, conspicuous sweeping hairs outside. **Cypselas** obovoid, bilaterally compressed. **Pappus** a laciniate cupule. $x = 7$, 13 (6, 17, 1 report each) (aneuploids, B-chromosomes, polyploidy).

Species 60, tropical America, Africa and Madagascar; 4 in sthn Afr., known from Namibia, Botswana, Northern Province, Gauteng, Mpumalanga, KwaZulu-Natal and Eastern Cape.

Aspilia is regarded as a synonym of *Wedelia* by some authors, but until a thorough revision of the genus in Africa is done, the genus is recognised as such.

Aster L. 8900000

(Astereae)

Linnaeus: 872 (1753); Linnaeus: 373 (1754); Lippert: 153 (1973); Hilliard: 59 (1977); Bremer: 413 (1994).

Perennial, rarely annual, herbs. **Leaves** alternate, sessile, entire, toothed or rarely incised, often nerves conspicuously raised, hairy or glabrous and sometimes glandular. **Capitula** radiate, large or medium-sized, occasionally small, solitary or in panicles or corymbs, pedunculate. **Involucre** campanulate or subhemispherical; bracts imbricate, in 3 or 4(5) rows. **Receptacle** flat or convex, epaleate. **Ray florets** female, fertile or rarely sterile; staminodes sometimes present; corolla blue, violet or white, in 1 or 2 rows, tubular below, mostly glandular-hairy, often hairy as well, produced into a strap-shaped, 3-toothed lamina in upper part. **Disc florets** bisexual, fertile or rarely inner ones functionally male; corolla yellow, rarely purplish, tubular, expanded above, 5-toothed, always glandular-hairy. **Anthers** ecalcarate and ecaudate; apical appendage ovate-lanceolate, flat. **Style** branches narrowly oblong; apex triangular, with conspicuous sweeping hairs outside. **Cypselas** elliptic to obovate, compressed, bright to dark brown to blackish, usually with thickened margins, hairy and with multicellular glands. **Pappus** in 2 rows, inner row of bristles, outer of short narrow scales or bristles or in 1 row, of bristles only. $x = 8, 9$ (5, 7) (aneuploids, high polyploidy, B-chromosomes).

Species ± 250, mainly northern hemisphere, America, Europe and Asia; 16 in sthn Afr., 1 naturalised; widespread. J.C. Semple (University of Waterloo, Canada) (pers. comm.) believes there are no true *Aster* species in sthn Afr.

Athanasia L. 9326000

(Anthemideae)

Linnaeus: 1180 (1763); Harvey: 187 (1865); Hilliard & Burtt: 328 (1973); Källersjö: 530 (1985); Källersjö: 15 (1991); Bremer & Humphries: 95 (1993); Bremer: 448 (1994).

Stilpnophyton Less.: 264 (1832). *Asaemia* (Harv.) Benth.: 433 (1873a); Bremer: 193 (1983).

Shrubs or subshrubs, glabrous or variously pubescent, indumentum of stellate, rarely simple, hairs. **Leaves** alternate, rarely opposite, sessile, often imbricate, ericoid, entire, dentate or pinnatifid, linear to ovate to spathulate in outline, occasionally somewhat fleshy. **Capitula** discoid, small, densely corymbose, rarely

solitary. **Involucre** linear, campanulate or urceolate to rotundate; bracts in 3–5 rows, scarious, sometimes ciliate, glabrous or pilose, sometimes glandular. **Receptacle** flat, generally paleate, sometimes epaleate; paleae scarious, flat or canaliculate, entire or apically lacerate, glabrous or with few hairs. **Disc florets** bisexual, fertile; corolla yellow, rarely creamy white, funnel-shaped, gradually expanding into wide 5-lobed limb; tube generally with long-stalked glands. **Anthers** ecalcarate and ecaudate; apical appendage ovate; endothecial tissue polarised. **Style** branches apically truncate, with obtuse sweeping hairs. **Cypselas** cylindrical-obovoid, generally with 5–12 protruding and narrow ribs, glabrous or occasionally glandular. **Pappus** 0 or often a pseudopappus of stalked glands. $x = 8$ (polyploidy).

Species 39, endemic to sthn Afr., Northern, Western and Eastern Cape, 1 extending to KwaZulu-Natal and 1 extending to Namibia.

Athrixia Ker Gawl. 9055000

(Gnaphalieae)

Ker Gawler: t. 681 (1823); Harvey: 291 (1865); Kroner: 46 (1980); Anderberg: 47 (1991a); Anderberg: 323 (1994).

Perennial herbs or shrubs. **Leaves** alternate, sometimes radical, sessile, leafbases often decurrent, lanceolate, ovate-lanceolate, linear, sometimes needle-like, frequently with revolute, entire margins, hairy (hair type B) and glandular-hairy. **Capitula** radiate, solitary, terminal, sessile or pedunculate, rarely aggregated and spike-like. **Involucre** cup-shaped or campanulate; bracts in 6–8 rows, lanceolate to linear, spreading and bristle-pointed and often ciliate above and woolly on back; stereome undivided. **Receptacle** flat, epaleate. **Ray florets** female, in 1 row; corolla white or purple; tube usually cylindric, with minutely 3-toothed elliptic to lanceolate lamina ± as long as tube, glandular-hairy. **Disc florets** bisexual; corolla yellow or white; tube slightly widening upwards, with 5 ovate lobes. **Anthers** ecalcarate, caudate; with oblong, apical appendage, endothecial tissue polarised. **Style** bifid; style branches obtuse, dorsally with obtuse sweeping hairs not reaching furcation; stigmatic surface basally separated but apically converging. **Cypselas** 3–6-ribbed, brown, sparsely hairy with elongated twin hairs. **Pappus** white, persistent, in 2 rows, outer row of scales, rarely subbarbellate bristles, inner row of subbarbellate bristles.

Species 14, south and tropical Africa and Madagascar; 9 in sthn Afr., widespread but absent from Namibia, Botswana and Northern Cape.

Atrichantha Hilliard & B.L.Burtt 9045010

(Gnaphalieae)

Hilliard & Burtt: 219 (1981); Anderberg: 74 (1991a); Anderberg & Bremer: 1061 (1991); Anderberg: 330 (1994).

Dwarfshrub or subshrub to 1 m tall. **Leaves** ericoid, sessile, twisted, concave, adaxially tomentose, subtending short, densely leafy axillary shoots. **Capitula** discoid, solitary or a few in clusters, 17–140-flowered. **Involucral bracts** in 5–9 rows, imbricate, outer ones adaxially villous; stereome undivided or rarely with a few pellucid lines, lamina lanceolate, subacute, opaque, snow-white, sometimes scarlet above stereome, exceeding florets, radiant. **Receptacle** shortly alveolate. **Disc florets** bisexual, purple, lobes erect, glabrous, deltoid. **Style** branches truncate, very slightly rounded, penicillate, pilose in upper part. **Cypselas** cylindric, very obscurely 5-costate, glabrous, cells of epidermis convex or almost flat. **Pappus** subplumose above, clavate cells not spirally thickened, shaft scabrid, base with spreading, noncohering hairs.

Monotypic: *Atrichantha gemmifera* (Bolus) Hilliard & B.L.Burtt, endemic to the Western Cape mountains.

***Baccharis** L. 8933000

(Astereae)

Linnaeus: 860 (1753); Linnaeus: 370 (1754); Hellwig: 1 (1990); Bremer: 413 (1994).

Baccharidastrum Cabrera: 175 (1937). *Baccharidiopsis* Barroso: 95 (1975).

Usually viscid shrubs or subshrubs, sometimes small trees, generally dioecious or only rarely monoecious. **Stems** or branches commonly striate or angled. **Leaves** alternate, rarely opposite, simple, entire, toothed or lobed, occasionally reduced to scales. **Capitula** discoid or very rarely disciform, small, solitary or in racemes. **Involucre** campanulate or cup-shaped; bracts imbricate, recurved in female plants when fruit mature. **Receptacle** flat or convex, mostly epaleate. **Male capitula** with bisexual functionally male florets; corolla tubular below, campanulate to funnel-shaped above, tube hairy, rarely also glandular, 5-lobed, yellowish white. **Anthers** ecalcarate and ecaudate; with ovate-lanceolate, flat apical appendage. **Style** without papillae, shortly bilobed, not spreading, with sweeping hairs. **Pappus**: 1 row of persistent bristles. **Floret base** with ring-like nectarium. **Female capitula** with filiform female florets only, very rarely with few central bisexual florets as well, pubescent and glandular, apex 5-lobed, greenish white. **Style** without sweeping hairs, 2-lobed, spreading. **Cypselas** cylindrical or spindle-shaped, rarely ovate or elliptic, somewhat compressed, 8–10-(12-)ribbed, glabrous. **Pappus** of accrescent bristles in many rows. $x = 9$ (5—1 report) (aneuploids, B-chromosomes, polyploidy).

Species ± 400; South and North America; 1 naturalised in sthn Afr.: **Baccharis pingraea* DC., KwaZulu-Natal.

Baccharoides Moench 8751040

(Vernonieae)

Moench: 578 (1794); Robinson: 249 (1990); Isawumi: 311 (1993); Bremer: 217 (1994); Isawumi *et al.*: 218 (1996).

Vernonia subsect. *Stengelia* Sch.Bip. ex Walp.: 946 (1843). *Vernonia* sect. *Stengelia* (Sch.Bip. ex Walp.) Benth.: 127 (1873a). *Stengelia* Steetz: 360 (1864).

Annual or perennial herbs or subshrubs. **Leaves** alternate, petiolate or subsessile, pubescent to glabrescent, sometimes glandular or gland-dotted, margin serrate. **Capitula** discoid, solitary, terminal or lateral to many, aggregated in paniculate to corymbose groups. **Involucre** broadly campanulate or cup-shaped. **Involucral bracts** in many rows, apically appendaged, slightly pubescent to woolly tomentose; appendages white or variously coloured. **Receptacle** epaleate. **Disc florets** bisexual; corolla whitish or purple, with long slender basal tube, abruptly expanded cylindrical limb and short erect lobes; veins forming arch at corolla lobe without median trace; lobes pubescent, also hairs at throats of limbs and tubes. **Anthers** calcarate, ecaudate; apical appendage flat, ovate, with blunt or acute tips; endothecial tissue polarised; filament collar cylindrical, sometimes slightly dilated distally. **Style** bifid; branches apically tapering, long-exserted, with distinct stigmatic areas throughout inner portions, outsides covered with unicellular hairs down to upper portion of shaft; style base enclosed by long and cylindrical nectary. **Cypselas** homomorphic, brown to dark brown, cylindrical, turbinate or elongated, 8–20-costate, pubescent or glabrous, with or without twin hairs, with or without glands, with or without carpopodium (fruit stalk); ovary crystals narrowly elongate, hexagonal, sometimes large. **Pappus** bristles in many

rows, sometimes with outer row of small scales, inner capillary ones flat or widened towards apex, caducous or persistent, barbellate on margins, sometimes connate to form annulus.

Species ± 30, tropical Africa and India; 2 in sthn Afr.: *Baccharoides adoensis* (Sch.Bip. ex Walp.) H.Robinson and *B. anthelmintica* (L.) Moench, Namibia, Botswana, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Berkheya Ehrh. 9438000

(Arctoteae)

Ehrhart: 137 (1788); Harvey: 501 (1865); Oliver & Hiern: 428 (1877); Phillips: 847 (1951); Roessler: 104 (1959); Hilliard: 547 (1977); Bremer: 261 (1994).

Crocodilodes Adans.: 127 (1763). *Stephanocoma* Less.: 485 (1865). *Stobaea* Thunb.: 141 (1800).

Perennial herbs or subshrubs, sometimes cobwebby or woolly. **Leaves** alternate or radical, rarely opposite, sometimes decurrent, subentire, toothed, pinnatifid or pinnatisect, teeth spinescent. **Capitula** radiate or discoid, several- to many-flowered, terminal on single stems or on branchlets, rarely axillary, rarely corymbose or umbellate. **Involucre** campanulate; bracts in few to many rows, connate at base, tips and often margins spiny. **Receptacle** flat, honeycombed fimbrilliferous. **Ray florets** neuter, in single row, strap-shaped. **Disc florets** bisexual, fertile or sometimes inner ones male, tubular, dilated above, deeply 5-lobed. **Anthers** linear, sagittate at base; with lanceolate, apical appendage. **Style** terete, undivided or with linear, obtuse branches. **Cypselas** ± obovoid, ribbed, pilose or glandular, pubescent to glabrous. **Pappus** of short or long scales or bristles. $x = 7, 8$.

Species 75, Africa; 71 in sthn Afr., widespread.

Bidens L. 9237000

(Heliantheae)

Linnaeus: 831 (1753); Linnaeus: 362 (1754); Candolle: 593 (1836); Oliver & Hiern: 392 (1877); Sherff: 1 (1937); Phillips: 818 (1951); Henderson & Anderson: 326, 328 (1966); Hilliard: 316 (1977); Mesfin: 24 (1984); Mesfin: 437 (1993); Karis & Ryding: 614 (1994).

Annual or perennial herbs. **Leaves** opposite, sessile or petiolate, simple to deeply and irregularly 2- or 3-pinnatisect; blade or segments linear to broadly ovate, entire, serrate-crenate, or variously incised. **Capitula** radiate, occasionally ray florets 0, on long peduncles, solitary and terminal or arranged in lax corymbiform or paniculiform cymes. **Involucre** campanulate or subhemispherical; bracts ± in 2 rows, outer herbaceous to coriaceous, inner one membranous to subcoriaceous. **Receptacle** flat to conical. **Ray florets** neuter, rarely female; corolla white, pink, crimson, orange or yellow, strap-shaped. **Disc florets** bisexual, fertile; corolla yellow, narrowly cylindric below, expanded above, 5-lobed with lobes papillose. **Anthers** obtuse or minutely sagittate at base; with ovate apical appendage. **Style** swollen at base, terete; branches narrowly oblong, apex acute with subulate appendage, short sweeping hairs on outer face. **Cypselas** 3- or 4-angled or dorsiventrally compressed, linear-oblong to broadly ovate, sometimes beaked. **Pappus** of 2–4 awns, usually barbed. $x = 6, 8$ (5, 11, 17, 23) (aneuploids, high polyploidy, B-chromosomes).

Species 233, cosmopolitan; 6 in sthn Afr., 2 of them, **Bidens bipinnata* L. and **B. pilosa* L. are introduced, widespread, roadside weeds and noxious weeds of cultivation, absent from the Western Cape.

Blainvillea Cass. 9190000

(Heliantheae)

Cassini: 493 (1823); Candolle: 492 (1836); Bentham: 369 (1873a); Oliver & Hiern: 374 (1877); Phillips: 815 (1951); Wild: 38 (1967); Karis & Ryding: 589 (1994).

Perennial herbs with striate, glabrescent branches. **Leaves** opposite, shortly petiolate, elliptic to lanceolate, entire or remotely toothed, scantily pubescent. **Capitula** radiate or almost disciform, few-flowered, in lax cymose panicles, often solitary in forks of inflorescence branches. **Involucre** campanulate or subglobse; bracts in 2–5 rows. **Receptacle** somewhat convex, paleate; paleae as long as florets, membranous, irregularly toothed above. **Ray florets** female, fertile; corolla white; tube cylindric with short, obovate, shortly bifid lamina. **Style** terete; branches linear, obtuse. **Cypselas** 2- or 3-angled, dorsiventrally compressed. **Pappus** of 3 barbellate awns. **Disc florets** bisexual, fertile; corolla white; tube cylindric, campanulate above, shortly 5-lobed. **Anthers** faintly eared at base; apical appendage ovate. **Style** terete, base swollen; branches linear, obtuse. **Cypselas** oblong 2–4-angled, usually laterally compressed. **Pappus** of 2 barbellate awns or unequal, shortly connate scales. $x = 17$ (8, 9) (polyploidy).

Species 10, pantropical; 1 in sthn Afr.: *Blainvillea gayana* Cass., N Botswana and Northern Province.

Blumea DC. 8939000

(Inuleae)

Candolle: 514 (1833) name conserved; Harvey: 119 (1865); Randeria: 176 (1960); Merxmüller: 35 (1967a); Wild: 125 (1969a); Hilliard: 113 (1977); Anderberg: 105 (1991b); Anderberg: 284 (1994).

Annual or perennial herbs, usually pubescent, aromatic; stems not winged. **Leaves** alternate, simple, dentate or serrate, sessile or shortly petiolate. **Capitula** disciform, in loose or dense corymbs or panicles. **Involucre** campanulate or hemispherical; bracts in few to many rows, narrow, cartilaginous. **Receptacle** flat or slightly convex, epaleate, with scale-like ridges. **Outer florets** female, in several rows, filiform, 2–4-toothed, yellow. **Central florets** bisexual, tubular, widening upwards, with 5 short lobes, yellow, sometimes white or purplish. **Anthers** caudate and minutely calcarate; endothecial tissue polarised. **Style** bifid with acute sweeping hairs, not reaching the furcation. **Cypselas** narrowly oblong, hairy; epidermis with elongated crystals. **Pappus** of barbellate, capillary bristles in 1 row. $x = 9$ (8, 10, 11) (aneuploids, high polyploidy, B-chromosomes).

Species ± 100, tropical Africa to Asia and Australia; 1 in sthn Afr.: *Blumea mollis* (D.Don) Merrill, Namibia, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland and KwaZulu-Natal.

Bothriocline Oliv. ex Benth. 8746000

(Vernonieae)

Bentham: 226 (1873a); Oliver & Hiern: 265 (1877); Phillips: 776 (1951); Bremer: 218 (1994).

Volkensia O.Hoffm.: 387 (1889).

Perennial or rarely annual herbs or shrubs. **Leaves** alternate, opposite or sometimes whorled, subsessile, broadly lanceolate, serrate. **Capitula** discoid, many-flowered; solitary or corymbose. **Involucre** campanulate or cyathiform; bracts in few to many rows, the outer smallest with scarious margins. **Receptacle** plane or alveolate. **Corolla** purple or mauve; tube cylindric below, widening above; lobes 5, ovate-lanceolate. **Anthers** shortly and bluntly sagittate, with lanceolate, membranous, apical appendage; connective ± slightly swollen near base. **Style** exserted; arms filiform, thinly hispid. **Cypselas**

oblong-obovoid, 4-angled, often strongly 4-ribbed, glabrous except for minute tubercles between ribs. **Pappus** of few, barbellate, caducous bristles. $x = 10$ (9—1 report) (polyploidy).

Species ± 30, in tropical Africa; 1 in sthn Afr.: *Bothriocline laxa* N.E.Br., Northern Province, Mpumalanga and Swaziland.

Brachylaena R.Br. 8936000

(Tarchonantheae)

Brown: 115 (1817); Harvey: 115 (1865); Phillips & Schweickerdt: 205 (1937); Paiva: 368 (1972); Hilliard: 105 (1977); Pope: 5 (1992); Bremer: 97 (1994); Herman: 42 (1998a).

Shrubs or trees, dioecious, rarely florets bisexual. **Leaves** alternate, shortly petiolate or subsessile, entire or spinulose-denticulate or repand or coarsely dentate towards apex, glabrous above and often pale tomentose beneath. **Synflorescences** arranged in clusters or glomerules; capitula pedunculate or sessile, unisexual, discoid; flowers yellow. **Involucre** oblong, ovoid or campanulate; bracts in 3 to many rows, imbricate. **Receptacle** flat or slightly convex, honeycombed, epaleate. **Male capitula** with corolla tubular below, expanded above, usually 5(6)-lobed. **Anthers** calcarate and caudate; apical appendage long, flat; endothecial tissue polarised. **Style** terete, filiform, thickened above, simple or bifid; ovary abortive. **Pappus** of scabrid or subplumose bristles in 1 row, sometimes sparingly developed. **Female capitula** with corolla filiform, 5-lobed; staminodes sometimes present. **Style** branches short, flat, ovate-lanceolate. **Cypselas** subcylindric-fusiform, ± 8-ribbed, pubescent or subglabrous. **Pappus** of scabrid bristles in several rows.

Species ± 15, Africa and Mascarene islands; 9 in sthn Afr., widespread but absent from Namibia, Free State and Northern Cape.

Bryomorphe Harv. 9047000

(Gnaphalieae)

Harvey: 151 (1863); Harvey: 277 (1865); Bentham: 324 (1873a); Levyns: 283 (1942); Anderberg: 70 (1991a); Anderberg: 330 (1994).

Small, tufted, copiously branched, moss-like plants, up to 70 mm tall. **Main branches** woody, leafy throughout, up to 1.5 mm diameter, pressed tightly together in rock crevices; aerial roots present. **Leaves** sessile, closely imbricate, ascending, linear, margins entire, slightly involute, adaxial surface woolly. **Capitula** radiate or almost disciform, 12–14-flowered, 5–6 mm long, 3–4 mm wide, 1–3 heads terminal on branches, partially concealed by uppermost leaves. **Involucral bracts** 24–31; outer bracts foliaceous in upper part and along midvein, ovate; inner bracts scarious, up to 5 mm long, linear to narrowly oblong, hyaline-winged at apex. **Receptacle** conical, less than 2 mm in diameter, honeycombed. **Ray florets** 6 or 7, female, white; lamina 3-lobed, ± 2 mm long, 1.5 mm wide; tube 4.5–5.5 mm long. **Disc florets** 7–9, bisexual, 5-lobed, wine-red, 3.5–4.0 mm long. **Anthers** apically acuminate, basally tailed. **Style** branches truncate with obtuse sweeping hairs apically, stigmatic surfaces separated. **Nectary** a small disc between style base and cypsela. **Cypselas** rod-like, ± 1 mm long, straw-coloured, surface smooth. **Pappus**: bristles free, 22–28, ± 4.5 mm long, barbed in lower three-quarters, plumose in upper quarter.

Monotypic: *Bryomorphe aretioides* (Turcz.) Druce, endemic to Western Cape.

Cadiscus E.Mey. ex DC. 9287000

(Senecioneae)

Candolle: 254 (1838b); Harvey: 134 (1865); Phillips: 819 (1951); Bremer: 499 (1994).

Fleshy, aquatic herbs. **Leaves** alternate, linear, amplexicaul, margin entire, glabrous. **Capitula** radiate; with many florets, solitary, pedunculate, opposite the leaves. **Involucre** campanulate, of 8–10 scales connate into cup in lower half. **Receptacle** slightly convex, epaleate. **Ray florets** female; corolla white; tube short, slender, lamina ovate, entire or 3-toothed, longer than tube. **Style** linear; branches linear, obtuse. **Cypselas** terete, ribbed, hirsute on ribs. **Pappus** of setose, somewhat accrescent awns. **Disc florets** functionally male; corolla yellow, tube slender, campanulate above, lobes 5. **Anthers** obtuse at base, apiculate. **Style** undivided. $x = 10$.

Species 1: *Cadiscus aquaticus* E.Mey. ex DC., endemic in the Western Cape.

***Calendula** L. 9423000

(Calenduleae)

Linnaeus: (1735); Meikle: 206 (1976); Nordenstam: 373 (1994).

Annual or perennial herbs, sometimes woody at base, often glandular and aromatic. **Leaves** alternate, simple, sessile, entire or shallowly toothed. **Capitula** radiate, solitary and pedunculate; sometimes branched. **Involucre** campanulate or hemispherical; bracts in 1 or 2 rows, linear, acuminate, subequal, with narrow scarious margin. **Receptacle** flat, epaleate. **Ray florets** female, fertile, strap-shaped, yellow or orange. **Disc florets** functionally male, tubular, yellow, orange, brown or violet-purple. **Anthers** ecalcarate, sagittate-caudate; filaments free; endothecial tissue polarised. **Style** of disc florets undivided, with acute conical tip surrounded by ring of short hairs. **Outer cypselas** with narrow beak, sometimes cymbiform, or 3-winged; inner smaller, strongly falcate or almost annular, sometimes winged; all dorsally tuberculate-rugose. **Pappus** 0. $x = 8$ (5, 7, 9, 11) (aneuploids, polyploidy).

Species ± 15, Macaronesia, Africa, Mediterranean region, southern and central Europe, Turkey, Iraq, Iran, Yemen; 1 naturalised as weed in sthn Afr.: **Calendula arvensis* L., KwaZulu-Natal.

Callilepis DC. 9094000

(Gnaphalieae)

Candolle: 671 (1836a); Harvey: 136 (1865); Phillips: 810 (1951); Hilliard: 286 (1977); Anderberg: 46 (1991a); Anderberg: 324 (1994).

Zoutpansbergia Hutch.: 350 (1946).

Perennial herbs with tuberous or subwoody rootstocks, producing annual stems, or small shrubs. **Leaves** alternate, sessile, linear to elliptic, glabrous or with glandular hairs, margin flat, usually entire. **Capitula** radiate; many-flowered, solitary at end of long peduncles. **Involucre** campanulate; bracts in 3 rows, narrowly lanceolate, glabrous. **Receptacle** flat, paleate; palea boat-shaped. **Ray florets** female, in 1 row, fewer than disc florets; staminodes often present; corolla white, tube with linear-oblong or elliptic, 3-toothed lamina, longer than tube. **Cypselas** triquetrous. **Disc florets** bisexual; corolla purplish; tube somewhat campanulate above, with lanceolate lobes ± 1/3–1/2 as long as tube. **Anthers** linear, tailed at base; with lanceolate, apical appendage. **Style** terete; branches obtuse with hairs dorsally ending below apex as ring of longer hairs. **Cypselas** flattened to somewhat triquetrous, sparsely hairy. **Pappus** of scale-like awns.

Species 5, endemic in sthn Afr., known from Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Calostephane Benth. 9069000

(Inuleae)

Bentham: 10, t. 1111 (1876); Merxmüller: 37 (1967a); Hilliard: 279 (1977); Anderberg: 89 (1991b); Anderberg: 285 (1994).

Herbaceous plants, often erect annuals. **Leaves** alternate, sessile or petiolate, sometimes decurrent in long wings,

linear to lanceolate, margins dentate. **Capitula** either radiate or discoid, solitary on long peduncles. **Involucre** campanulate; bracts in 2 rows, linear, usually ciliate, strigose or glandular. **Receptacle** flat, epaleate, foveolate. **Ray florets** (if present) female; corolla yellow, strap-shaped, 3-lobed. **Disc florets** bisexual, fertile; corolla yellow, tube widened gradually upwards, glandular-hairy, 5-lobed. **Anthers** minutely calcarate, caudate; with lanceolate apical appendage; endothecial tissue polarised. **Style** branches of female florets linear, obtuse; of bisexual florets linear, subacute; with acute sweeping hairs not reaching furcation. **Cypselas** oblong, subterete, ribbed, glands alternating with ribs. **Pappus** double; outer row of 5 small obovate, membranous scales; inner row of bristles with broad, membranous wings above middle; or of scales similar to those of outer rows.

Species 6, tropical Africa and Madagascar; 2 in sthn Afr.: *Calostephane divaricata* Benth. and *C. marlothiana* O.Hoffm., Namibia, Botswana, Northern Province, Swaziland and KwaZulu-Natal.

Calotesta P.O.Karis 9043010

(Gnaphalieae)

Karis: 25 (1990); Anderberg: 74 (1991a); Anderberg: 330 (1994).

Much-branched shrublet, densely whitish-tomentose with axillary brachyblasts of crowded small leaves; older branches glabrous or subglabrous, often with scale-like withered leaf bases. **Leaves** closely to very closely set, involute ericoid, lanceolate to obovate, entire, acute, mucronate. **Capitula** discoid, mainly solitary, sometimes 2 or 3 together, 15–40-flowered. **Involucre** campanulate, 4–9 mm wide. **Receptacle** broadly conical, epaleate. **Involucral bracts** in 3 or 4 rows, outermost foliaceous or subfoliaceous, lanceolate to narrowly ovate and acute to acuminate, inner bracts with a scarious or mostly conspicuously petaloid lamina and undivided stereome, innermost with few hairs abaxially only. **Disc florets** bisexual, narrowly cylindrical, glabrous, 3.0–3.5 mm long, reddish above; lobes 5, spreading, deltoid. **Anthers** with a weakly narrowing, flat, narrowly ovate apical appendage, caudate, tails long, very branched. **Style** basally thickened, branches narrowly oblong, flat or semiterete, with stigmatic areas in two distinct, not confluent lines, apically truncate, penicillate; sweeping hairs short, obtuse. **Cypselas** narrowly oblong, irregular, dark brown, ribbed. **Pappus** barbellate, soon caducous, bristles free.

Monotypic: *Calotesta alba* Karis, endemic to Western Cape.

*Campuloclinium DC. 8816040

(Eupatorieae)

Candolle: 136 (1836a); Hilliard: 54 (1977) under *Eupatorium*; King & Robinson: 126 (1987); Bremer *et al.*: 658 (1994).

Perennial herbs or subshrubs. **Leaves** opposite or alternate, sessile or on narrowly winged petioles; blades ovate to narrowly oblong. **Capitula** discoid, florets 30–100; in corymbose inflorescences. **Involucral bracts** ± 15–30, eximbricate to weakly subimbricate, in 2 or 3 rows, usually broad. **Receptacle** rounded to conical, with small prominent scars. **Corolla** purplish pink, funnel-shaped with basal tube slightly constricted above nectary; lobes dorsally papillose. **Style** with base usually pubescent; branches with mamillose to papillose appendage. **Cypselas** narrowly cylindric, 4-angled, angles sparsely scabrid, faces black, gland-dotted. **Pappus** of many scabrid bristles, tips pink.

Species 14, Brazil, Paraguay, Argentina; 1 in sthn Afr., a garden escape, **Campuloclinium macrocephalum* (Less.) DC., Northern Province, Gauteng, Swaziland and KwaZulu-Natal.

*Carduus L. 9461000

(Cardueae)

Linnaeus: 820 (1753); Oliver & Hiern: 433 (1877); Phillips: 849 (1951); Kazmi: 300 (1963–1964); Henderson & Anderson: 330 (1966); Hilliard: 576 (1977); Bremer: 143 (1994).

Annual or perennial herbs with spiny-winged stems. **Leaves** rosulate to alternate, serrate, sinuate-dentate or pinnatifid, teeth spinose or occasionally rigidly ciliate. **Capitula** discoid, many-flowered, sometimes terminal, on long peduncles, sometimes subsessile or glomerate. **Involucre** ovoid, globose or cylindric; bracts in many rows, patent or recurved, spiny. **Receptacle** flat or convex, densely setose. **Florets** bisexual, fertile; corolla purple or white, tube narrowly cylindric below, dilated above, deeply lobed or sometimes ± 2-lipped. **Anthers** with bases sagittate, adjacent auricles connate and produced into entire or lacerated tail; filaments glabrous or pilose. **Style** abruptly thickened above with ring of hairs below thickening; branches short, obtuse, minutely papillose, rarely filiform. **Cypselas** obovoid-oblong, smooth, glabrous, with apical rim. **Pappus** of scabrid to barbellate, decidous bristles, basally connate in ring. x = 8, 9, 11 (6, 7, 10, 13) (aneuploids, high polyploidy, B-chromosomes).

Species 91, Eurasia, Mediterranean region, East Africa; 2 in sthn Afr.: **Carduus tenuiflorus* Curtis, known from Gauteng, Western and Eastern Cape, and **C. macrocephalus* Desf., occurring in the Eastern Cape, are introduced weeds.

*Carthamus L. 9477000

(Cardueae)

Linnaeus: 830 (1753); Oliver & Hiern: 439 (1877); Hanelt: 302 (1976); Bremer: 151 (1994).

Branched, annual herbs with glandular indumentum. **Leaves** alternate, pinnatifid to pinnatisect with spiny margins. **Capitula** discoid, solitary. **Involucre** with bracts in many rows, imbricate, spiny, outer leaf-like, inner sometimes with apical appendages. **Florets** all bisexual; corolla yellow. **Anthers** with filaments usually densely bearded. **Cypselas** obovoid to broadly obconical, 4-angled, smooth, glabrous, with apical rim; cypselas in outer florets generally rugose. **Pappus** usually double, outer row of subulate, serrulate-ciliate, persistent scales, inner row with scales shorter and basally connate. x = 6, 10 (8, 11) (aneuploids, high polyploidy, B-chromosomes).

Species 14, Mediterranean region, Asia; 1 in sthn Afr.: *Carthamus lanatus* L., occurs sporadically in the Northern and Western Cape.

*Centaurea L. 9476000

(Cardueae)

Linnaeus: 909 (1753); Linnaeus: 389 (1754); Oliver & Hiern: 436 (1877); Phillips: 849 (1951); Hilliard: 580 (1977); Bremer: 151 (1994).

Annual or perennial herbs, usually cano-tomentose. **Leaves** alternate, sometimes radical, entire or sometimes toothed or pinnatisect. **Capitula** usually disciform or 'radiate' (not true ray florets, radiant), solitary or corymbose, rarely in elongated clusters. **Involucre** ovoid or globose; bracts generally with fimbriate-ciliate or lacerate, variously shaped appendages. **Receptacle** nearly flat, often fleshy, densely setose. **Florets** with outer row of florets neuter, inner bisexual; corolla purple, blue, yellow or white, tube slender below, dilated above, deeply 5-lobed, papillose or hairy; neuter florets sometimes larger. **Anthers** with bases sagittate, adjacent lobes connate and drawn out into long or short, entire or lacerate tail; filaments papillose or hairy. **Style** abruptly thickened below branches and there furnished with ring

of hairs; branches erect, connate, shortly bifid, lanceolate or linear, obtuse. **Cypselas** obovoid-oblong or obconical, somewhat compressed, glabrous or sparsely pilose; attachment scar lateral and oblique. **Pappus** generally double, outer row of scabrid, barbellate or plumose bristles or subulate scales, inner row or entire pappus rarely 0. $x = 9$ (7, 8, 10, 11) (aneuploids, B-chromosomes, polyploidy).

Species ± 450, mainly in the Mediterranean region and Near East; 5 in sthn Afr. as introduced weeds, known from North-West, Gauteng, Mpumalanga, Free State, KwaZulu-Natal, Northern, Western and Eastern Cape.

*Chromolaena DC. 8816020

(Eupatorieae)

Candolle: 133 (1836a); King & Robinson: 197 (1970b); Henderson *et al.*: 34 (1987); King & Robinson: 383 (1987); Bremer *et al.*: 655 (1994).

Heterolaena Sch.Bip. ex Benth.: 245 (1873a). *Osmia* Sch.Bip.: 251 (1866). *Eupatorium* section *Cylindrocephala* DC.: 141 (1836).

Sparingly to densely branched herbs or semiscandent shrubs. **Leaves** opposite, triangular to elliptic, margins subentire to lobed. **Capitula** discoid; 10–40-flowered, in lax to dense corymbs. **Involucral bracts** imbricate, ovate to lanceolate, apex often herbaceous or coloured. **Receptacle** flat or convex, sometimes paleate. **Corolla** white; cylindrical, glandular, often hairy. **Anther**: appendage sometimes with crenulate margins. **Style**: branch appendage linear, sometimes papillose. **Cypselas** prismatic, with 5, rarely 3 ribs, setose, sometimes glandular. **Pappus** of many capillary, scabrid bristles. $x = 10$ (aneuploids).

Species ± 165, all natives of North and South America, the West Indies; 1 weedy species in sthn Afr.: **Chromolaena odorata* (L.) R.M.King & H.Robinson from South America, naturalised in Mpumalanga and KwaZulu-Natal.

*Chrysanthellum Rich. 9232000

(Heliantheae)

Richard: 471 (1807); Oliver & Hiern: 394 (1877); Wild: 34 (1967); Turner: 417 (1988); Karis & Ryding: 614 (1994).

Annual herbs. **Leaves** alternate, bipinnatisect. **Capitula** radiate, pedunculate, terminal or axillary. **Involucre** hemispheric or campanulate; bracts in 1–3 rows, outer minute. **Receptacle** flat or slightly convex, paleate; paleae membranous, persistent, linear. **Ray florets** female; corolla yellowish, minutely 2-lobed or entire. **Disc florets** bisexual, often functionally male; corolla yellow or brownish, funnel-shaped, 5-lobed. **Anthers** obtuse at base, with apical appendage. **Style branches** of ray florets filiform, acute, those of disc florets well-developed with penicillate appendages. **Cypselas** of ray florets narrow, often with corky wings; disc cypselas compressed, winged or broadly spongy-cartilaginous. **Pappus** in ray florets 0, in disc cypselas of 2 minute teeth or a crown. $x = 8$ (9, 12—1 report each).

Species 13, Mexico, Central America, West Indies, Galapagos Islands; **Chrysanthellum indicum* DC., introduced weed in sthn Afr., known from Namibia, North-West and Northern Cape.

Chrysanthemoides Fabr. 9427020

(Calenduleae)

Fabricius: 144 (1759); Tournefort ex Medikus: 159 (1789); Norlindh: 367 (1943); Nordenstam: 373 (1994).

Osteospermum L. in part, Harvey: 433 (1865).

Shrubs, shrublets or small trees, sometimes spinescent, glabrous or ± cobwebby. **Leaves** alternate, mostly obovate and narrowed into petiole, entire or toothed. **Capitula** radiate, shortly pedunculate, usually few together or solitary, many-flowered. **Involucre** broadly campanulate; bracts in 2–4 rows, free, linear to ovate-lanceolate. **Receptacle** ± convex, glabrous or pubescent, epaleate. **Ray florets** female, fertile; corolla yellow, tube sometimes rudimentary, with ± oblong-elliptic, 3-toothed lamina up to 4½ × its length. **Staminodes** sometimes present. **Style** linear, with linear, obtuse branches. **Fruit** a drupe, shiny black or blue; endocarp hard, globose to obovoid or subcylindric, smooth or with ± raised nerves. **Pappus** 0. **Disc florets** functionally male; corolla tube funnel-shaped, glandular-hairy, with 5 lanceolate lobes. **Anthers** ecalcarate, shortly caudate; with ovate, apical appendage; endothecial tissue polarised. **Style** terete, minutely bifid. **Pappus** 0. $x = 9$ (10—1 report) (high polyploidy).

Species 2; extending into tropical East Africa; 2 in sthn Afr.: *Chrysanthemoides incana* (Burm.f.) Norl. and *C. monilifera* (L.) Norl., widespread but absent from Botswana, North-West and Gauteng.

*Chrysanthemum L. 9341000

(Anthemideae)

Linnaeus: 887 (1753); Harvey: 161 (1865); Bremer & Humphries: 135 (1993); Bremer: 465 (1994).

Annual herbs. **Leaves** alternate, serrate-dentate and pinnatifid, somewhat amplexicaul. **Capitula** radiate, pedunculate, solitary or laxly corymbose, many-flowered. **Involucre** campanulate; bracts in 2–4 rows, often with brown, scarious margin and sometimes membranous tip. **Receptacle** convex, epaleate. **Ray florets** female, fertile; corolla usually white or yellow, tube usually short, with entire or toothed lamina 3 times as long as tube. **Ray cypselas** triquetrous, laterally winged. **Disc florets** bisexual, fertile or sterile; corolla tube campanulate above, glandular, with 5 ovate lobes sometimes awned on back. **Anthers** ecalcarate and ecaudate; with ovate, apical appendage. **Style** with swollen base and with oblong, truncate branches. **Disc cypselas** prismatic with narrow adaxial wing, or terete with thick undulating wall, thus apparently ribbed. **Pappus** 0 in both disc and ray florets. $x = 9$ (7, 8, 10, 17, 19) (aneuploids, high polyploidy, B-chromosomes).

Species 2, Europe, Asia and North Africa; 2 naturalised in sthn Afr.: **Chrysanthemum coronarium* L. and **C. segetum* L., Mpumalanga and Eastern Cape.

Chrysocoma L. 8930000

(Astereae)

Linnaeus: 840 (1753); Harvey: 93 (1865); Merxmüller: 39 (1967a); Bayer: 259 (1981); Bremer: 417 (1994).

Shrublets. **Leaves** ericoid, alternate, sessile, linear to oblanceolate, entire or rarely dentate, glabrous or pubescent. **Capitula** discoid or rarely radiate, usually solitary and terminal, sometimes corymbose, pedunculate. **Involucre** campanulate or globose; bracts in 4 rows, imbricate, with membranous margins. **Receptacle** flat or convex, sometimes honeycombed, epaleate. **Ray florets**, if present, female, yellow or blue. **Style** with 2 branches. **Disc florets** bisexual, fertile, yellow; tube often gradually widened above, 5-lobed. **Anthers** linear, ecalcarate and ecaudate; with triangular, apical appendage. **Style** linear, with 2 linear branches, with long, triangular appendages and sweeping hairs. **Cypselas** compressed, obovate, marginally ribbed, apically usually with 2 resin sacs in ribs, pubescent, brownish. **Pappus** in 2 rows; outer row of short, acute to obtuse scales, basally weakly united, rarely reduced to a ring, sometimes 0; inner row of many barbellate caducous bristles. $x = 9$ (polyploidy).

Species 20, sthn Afr., widespread but not reaching Northern Province, Mpumalanga and Swaziland, 1 extending to Mozambique.

*Cichorium L. 9553000

(Lactuceae)

Linnaeus: 813 (1753); Oliver & Hiern: 446 (1877); Henderson & Anderson: 344 (1966); Hilliard: 597 (1977); Pope: 194 (1992); Bremer: 176 (1994).

Stiffly erect, perennial herbs with milky latex, with long, stout taproot. **Stems** annual, usually divaricately branched above, striate, densely hispid-setose to glabrescent. **Leaves** alternate, often rosulate, pinnatifid or coarsely toothed. **Capitula** ligulate, solitary or few together in sessile axillary clusters, spicately arranged along branches. **Involucre** cylindrical; bracts in 2 rows. **Receptacle** flat, epaleate. **Florets** bisexual; corolla strap-shaped, blue, rarely pink or white. **Anthers** sagittate at base, auricles mucronate-acuminate. **Style** with branches long, slender, obtuse and with sweeping hairs long. **Cypselas** obovoid-obconical, obscurely 5-angled, smooth, glabrous. **Pappus** of minute, rounded-obtuse scales. $x = 9$ (8, 10) (polyploidy).

Species 8, Europe, Mediterranean region, Ethiopia; **Cichorium intybus* L., cultivated in some parts of sthn Afr., now exists as a fairly widespread escape near cultivation, known from North-West, Gauteng, Northern, Western and Eastern Cape.

Cineraria L. 9406000

(Senecioneae)

Linnaeus: 1242 (1763); Linnaeus: 426 (1764); Harvey: 307 (1865); Merxmüller: 41 (1967a); Hilliard: 372 (1977); Bremer: 499 (1994).

Herbs or subshrubs, cano-tomentose to glabrate. **Leaves** alternate, sometimes radical, often broad and incised-toothed or variably pinnatisect, rarely entire, petiolate, sometimes auriculate, palmately veined. **Capitula** radiate, rarely discoid, in lax corymbs. **Involucre** campanulate, calyculate; bracts in 1 row, linear, sometimes with membranous margin. **Receptacle** flat, epaleate. **Ray florets** female; corolla yellow; tube cylindric, slightly to two and a half times shorter than lamina; lamina 3-toothed. **Disc florets** bisexual, fertile, rarely some functionally male; corolla tubular below, widened or narrowly campanulate above, glabrous; lobes 5, ovate. **Anthers** ecalcarate and ecaudate or faintly sagittate; with ovate-oblong, apical appendage; endothecial tissue radial. **Style** terete; branches truncate, penicillate, tipped with minute cone. **Cypselas** obovate, compressed, black or brown, margins thickened or winged, glabrous or ciliate. **Pappus** of several delicate, scabrid bristles, soon caducous. $x = 9$, 10 (polyploidy).

Species ± 50, Africa and Madagascar, 37 in sthn Afr., widespread but absent from Botswana.

*Cirsium Mill. 9462000

(Cardueae)

Miller: [334] (1754); Phillips: 849 (1951); Henderson & Anderson: 348 (1966); Hilliard: 578 (1977); Bremer: 143 (1994).

Perennial or rarely annual herbs. **Leaves** alternate, often decurrent, serrate or pinnately lobed, lobes and teeth spinescent or rarely rigidly ciliate. **Capitula** discoid, many-flowered, solitary, corymbose or variously clustered. **Involucre** ovoid or globose; bracts in many rows, spiny or innocuous. **Receptacle** flat or convex, densely setose. **Florets** bisexual, fully fertile or female; corolla purple, tube narrowly cylindric below, slightly widened above, deeply 5-lobed. **Anthers** linear, sagittate, adjacent auricles connate and prolonged into entire or lacerated tail. **Style** abruptly thickened below branches, often with ring of hairs there; branches, often partly connate, sometimes linear or filiform. **Cypselas** obovoid-oblong, glabrous, with nearly central, horizontal, basal attachment scar. **Pappus** of feathery bristles in several rows; connate at base. $x = 17$ (7, 8, 9, 10, 11, 12, 13, 15) (aneuploids, polyploidy, B-chromosomes).

Species ± 250, temperate regions of Europe and America; 2 in sthn Afr.: **Cirsium arvense* (L.) Scop. known from Mpumalanga and Eastern Cape, and **C. vulgare* (Savi) Ten. occurring in North-West, Gauteng, Northern, Western and Eastern Cape.

Comborhiza Anderb. & K.Bremer 9050030

(Gnaphalieae)

Anderberg & Bremer: 1070 (1991); Anderberg: 330 (1994).

Shrublet or suffrutex. **Stems** arising from subterranean, thick woody tubers or rhizomes. **Leaves** alternate or crowded on brachyblasts, sessile, straight, adaxially concave, glabrous above, glandular-hairy below, margin entire. **Capitula** radiate, solitary, on pedunculoid few-leaved stems or on long leafless peduncles. **Involucral bracts** with spathulate laminas. **Receptacle** flat or flat to convex, epaleate. **Ray florets** female, yellow with purple bands dorsally, in one row, fewer than disc florets. **Cypselas** as in disc florets. **Pappus** of narrow scales. **Disc florets** bisexual, corolla yellow. **Anthers** ecalcarate, with short tails; endothecial tissue polarised; apical appendage acute. **Style** branches truncate with obtuse sweeping hairs apically. **Cypselas** narrowly elliptic with 5 or 3 vascular bundles, glabrous or sparsely hairy with elongated twin hairs. **Pappus** of 5 barbellate capillary bristles and narrow scales, or of ± connate scales only.

Species 2, endemic to sthn Afr., *Comborhiza longipes* (K.Bremer) Anderb. & K.Bremer, Western Cape, and *C. virgata* (N.E.Br.) Anderb. & K.Bremer, KwaZulu-Natal.

Conyza Less. 8926000

(Astereae)

Lessing: 203 (1832); Harvey: 111 (1865); Merxmüller: 43 (1967a); Wild: 247 (1969b); Wild: 35 (1975); Hilliard: 86 (1977); Bremer: 418 (1994).

Annual or perennial herbs, rarely shrubs. **Leaves** alternate, rarely also in basal rosette, entire, toothed or rarely dissected. **Capitula** disciform or shortly radiate, in few-headed loose corymbs or panicles, rarely subglobosely arranged, rarely solitary. **Involucre** ± campanulate; bracts in 2 to many rows, imbricate, linear, usually hairy. **Receptacle** flat or slightly convex, epaleate, honeycombed, sometimes with margins of pits produced. **Marginal florets** female, fertile, usually in many rows; corolla shorter than style, tubular, filiform, truncate or minutely 2–5-lobed or with long or short lamina, white or pink. **Disc florets** bisexual, fertile or some functionally male, tubular, becoming campanulate above, 5-lobed, yellow or white. **Anthers** ecalcarate and ecaudate. **Style** branches of disc florets narrow and flattened, with broadly triangular appendage, with conspicuous sweeping hairs outside or elliptical with minute sweeping hairs. **Cypselas** small, compressed, smooth or 1-nerved on each face. **Pappus** of many barbellate bristles in 1 row, rarely in 2 rows, accrescent, ± concealing flowers. $x = 9$ (8, 12) (aneuploids, high polyploidy, B-chromosomes).

Species ± 60, cosmopolitan in warm areas; 15 in sthn Afr., 4 introduced, naturalised weeds; widespread.

*Coreopsis L. 9227000

(Heliantheae)

Linnaeus: 907 (1753); Linnaeus: 388 (1754); Oliver & Hiern: 387 (1877); Hilliard: 315 (1977); Karis & Ryding: 615 (1994).

Perennial herbs. **Leaves** opposite, rarely alternate, entire, lobed or dissected. **Capitula** radiate, pedunculate,

solitary or in lax corymbs. **Involucre** with bracts in 1 or 2 rows. **Receptacle** flat or slightly convex, paleate. **Ray florets** neuter or female, fertile or sterile; corolla yellow, strap-shaped. **Disc florets** bisexual, fertile or inner ones functionally male; corolla yellow, cylindric or narrowly campanulate, 5-toothed. **Anthers** with bases obtuse or minutely sagittate. **Style** with branches of disc florets truncate, penicillate or with subulate appendage. **Cypselas** compressed, often winged or with spiny or cartilaginous margins. **Pappus** of (1)2 barbed or nude awns or scales. x = 6, 13 (7, 9, 10) (aneuploids, high polyploidy).

Species ± 114, North and South America, Africa; **Coreopsis lanceolata* L., garden escape, occurs as a weed in Northern Province, Gauteng, Mpumalanga and KwaZulu-Natal.

Corymbium L. 8764000

(Not assigned to a tribe)
Linnaeus: 928 (1753); Jussieu: 176 (1789); Harvey: 55 (1865); Phillips: 777 (1951); Weitz: 599 (1989); Bremer: 68 (1994).

Acaulescent, herbaceous, tufted plants, monocotyledonous in appearance in vegetative state. **Leaves** basal, linear to broadly elliptic-lanceolate, parallel venation with or without prominent veins, glabrous, villous or hirsute. **Capitula** discoid, 1-flowered, arranged in racemes, panicles or corymbs. **Involucre** spindle-shaped; bracts in 2 rows with 2 upper bracts sheathing flower, glabrous or scabrid. **Corolla** mauve, pink or white, salverform with short tube; 5-lobed, lobes longer than tube, linear to oblong. **Anthers** linear, connate, shortly sagittate, without distinct apical appendage. **Style** exserted, terete, bifid; branches hispid on outer surface. **Cypselas** linear to elliptic, hirsute or villous. **Pappus** short, crown-like, or of free, fine bristles. x = 8 (1 report).

Species 9, endemic in sthn Afr.; Western Cape, ranging from the Cederberg in the north to the Cape Peninsula in the south, and in an easterly direction as far as Grahamstown (Eastern Cape), excluding the Knysna forest.

***Cosmos** Cav. 9238000

(Heliantheae)
Cavanilles: 9 (1791); Henderson & Anderson: 356 (1966); Correll & Johnston: 1664 (1970); Karis & Ryding: 615 (1994).

Annual herbs. **Leaves** opposite, sessile or with 2 ± widened and clasping petioles, lobed or 1–3-pinnatisect. **Capitula** radiate, solitary on terminal and lateral branches, long-peduncled. **Involucre** subhemispheric; bracts in 2 rows, connate basally, membranous. **Receptacle** flat. **Ray florets** neuter; corolla white, pink, lilac or orange, strap-shaped, entire or subdentate. **Disc florets** many, bisexual, fertile; corolla yellowish, cylindric but widening slightly near apex, equally 5-toothed terminally. **Style** with branches slender, thickened above, hirtellous, tipped with short and acute appendages. **Stamens** with hirsute filaments. **Cypselas** linear, ± fusiform-tetragonal, usually compressed, apically usually attenuate into beak. **Pappus** of 2–4(–8) barbellate or scabrid awns. x = 12 (11, 13, 17) (aneuploids, polyploidy, B-chromosomes).

Species 26, in tropical and warm regions of America, especially Mexico; 2 weeds in sthn Afr.: **Cosmos bipinnatus* Cav. known from the Northern Province, North-West, Gauteng, Mpumalanga, Free State and Lesotho, and **C. sulphureus* Cav. from KwaZulu-Natal.

Cotula L. 9351000

(Anthemideae)
Linnaeus: 891 (1753); Harvey: 177 (1865); Levyns: 131 (1941); Levyns: 805 (1950); Phillips: 826 (1951); Hilliard & Burtt: 119 (1970); Hilliard: 350 (1977); Bremer & Humphries: 157 (1993); Bremer: 472 (1994); Herman: 244 (1995).

Lancisia Fabr.: (1759). *Cenia* Comm.: 183 (1789); Harvey: 184 (1865). *Otochlamys* DC.: 77 (1838a); Harvey: 176 (1865).

Annual or perennial herbs. **Leaves** alternate or sometimes opposite or rosulate, entire to bipinnatisect. **Capitula** disciform or rarely radiate, few- to many-flowered, solitary, pedunculate; peduncle ± solid or sometimes inflated below head. **Involucre** subglobose or campanulate; bracts in ± 2 rows, usually scarious at least at margins. **Receptacle** flat to conical, often toothed with persistent pedicels, epaleate. **Marginal** florets female, fertile, in 1 or several rows, generally stalked; corolla tube short or absent, lamina generally absent, white if present. **Disc florets** bisexual, fertile, or functionally male; corolla tube campanulate, funnel-shaped, tubular or 4-angled, sometimes tubular below, expanded above, sometimes compressed or winged, sometimes pouched at base and wholly or partially enveloping ovary, 4-lobed, occasionally 3-lobed. **Anthers** ecalcarate and ecaudate, with ovate or lanceolate, apical appendage. **Style** branches of female flowers linear-lanceolate, of bisexual flowers oblong, truncate, penicillate. **Cypselas** generally stipitate, dorsally compressed, often laterally winged, generally with blunt uniseriate hairs. **Pappus** 0. x = 13 (8, 9, 10, 12) (aneuploids, high polyploidy).

Species ± 55, Africa, Australia, South America; 43 in sthn Afr.; widespread.

Crassocephalum Moench 9405010

(Senecioneae)
Moench: 516 (1794); Moore: 209 (1912); Merxmüller: 45 (1967a); Hilliard: 368 (1977); Bremer: 499 (1994).

Senecio L. in part, Harvey: 346 (1865). *Gynura* Cass. in part, Phillips: 832 (1951).

Perennial herbs, erect or climbing, or sometimes subshrubs, glabrous or hispid-pubescent. **Leaves** alternate, entire to pinnately dissected, margins dentate. **Capitula** discoid, solitary to corymbose, pedunculate, few- to many-flowered. **Involucre** oblong or campanulate, calyculate; bracts in 1 row, free, with membranous margin. **Receptacle** flat, epaleate. **Disc florets** bisexual, fertile; corolla yellow, red or blue; tube expanded above, with 5 linear to lanceolate lobes. **Anthers** linear, ecalcarate and ecaudate, with lanceolate or deltoid apical appendage; endothecial tissue radial. **Style** branches linear, truncate, penicillate, tipped with well-defined subulate appendage of fused papillae. **Cypselas** cylindric, ribbed. **Pappus** of many, fine, white bristles. x = 10 (polyploidy).

Species 24, Africa, Madagascar, Mascarene Islands, Yemen; 5 in sthn Afr., widespread in summer-rainfall parts but absent from North-West and Free State.

***Crepis** L. 9605000

(Lactuceae)
Linnaeus: 805 (1753); Linnaeus: 350 (1754); Harvey: 530 (1865) under *Anisoramphus*; Oliver & Hiern: 448 (1877); Hilliard: 633 (1977); Pope: 209 (1992); Bremer: 180 (1994).

Annual or perennial herbs, glabrous or pubescent, acaulescent or caulescent, with milky latex. **Leaves** mostly rosulate, glabrous. **Capitula** ligulate, many-flowered, solitary, terminal or in lax corymbs. **Involucre** cylindric-campanulate; bracts in 2 distinct unequal rows. **Receptacle** flat, epaleate, pitted, shortly fimbrilliferous. **Florets** bisexual, fertile; corolla yellow, tube shorter than lamina, oblong, 5-toothed. **Anthers** sagittate, with oblong, apical appendage. **Style** linear, becoming terete and pilose above, with linear, obtuse glandular branches. **Cypselas** subterete or marginal ones compressed, many-ribbed, sometimes attenuate into apical beak. **Pappus** of scabrid-barbellate bristles. x = 3, 4, 5 (7, 8, 10, 11) (aneuploids, B-chromosomes).

Species ± 200, northern hemisphere, tropical and sthn Afr.; **Crepis capillaris* (L.) Wallr. occurs as an introduced weed in KwaZulu-Natal and Eastern Cape, whereas **C. hypochaeridea* (DC.) Thell. is also found in the eastern parts of South Africa and Swaziland.

Cullumia R.Br. ex Aiton 9437000

(Arctoteae)

Aiton: 137 (1813); Harvey: 480 (1865); Phillips: 846 (1951); Roessler: 271 (1959); Bremer: 261 (1994).

Subshrubs or shrubs, sometimes cobwebby. **Leaves** alternate, densely set, small, spinous-ciliate and sometimes spine-tipped. **Capitula** radiate, several- to many-flowered, solitary, sessile, terminal on main and side branches, rarely axillary. **Involucre** campanulate; bracts in 4 rows, connate at base, rigidly spinose-ciliate, sometimes reflexed, glabrous. **Receptacle** flat, honeycombed. **Ray florets** neuter; corolla yellow, strap-shaped; tube somewhat compressed, with oblong-linear, 3- or 4-toothed lamina up to 6 times longer than tube. **Disc florets** bisexual, fertile; corolla yellow, tube slightly expanded or funnel-shaped, with 5 linear lobes. **Anthers** sagittate at base, with lanceolate, apical appendage. **Style** terete, with linear, obtuse branches. **Cypselas** oblong-ellipsoid, smooth, glabrous or very rarely minutely pilose. **Pappus** 0.

Species 15, endemic to Northern and Western Cape.

Cuspidia Gaertn. 9438010

(Arctoteae)

Gaertner: 454 (1791); Harvey: 510 (1865) under *Didelta*; Burtt: 69 (1948); Phillips: 847 (1951); Rocssler: 315 (1959); Bremer: 261 (1994).

Annual herbs, acaulescent or branched. **Leaves** alternate, stem-clasping, spinose-toothed, glabrous. **Capitula** radiate, several-flowered, solitary, terminal, peduncled or subsessile. **Involucre** campanulate; bracts connate; outer bracts ovate to elliptic, becoming lignified, usually with 3 large, marginal spines, membranous, veined; inner bracts spinous, membranous, veined. **Receptacle** flat, honeycombed, with rim of pits produced into membranous cups enclosing ovary. **Ray florets** neuter; corolla yellow; tube 0, lamina oblong, 4-toothed. **Disc florets** bisexual, fertile; corolla yellow; tube narrowly funnel-shaped, somewhat angled, glandular-hairy, with 5 linear lobes. **Anthers** sagittate at base, with lanceolate, apical appendage. **Style** terete, with linear, obtuse branches. **Cypselas** obovoid-obconical, sericeous. **Pappus** of linear, ciliate-barbellate, subulate scales. **Seeds** germinating within capitulum.

Monotypic: *Cuspidia cernua* (L.f.) B.L.Burtt is endemic to the Northern, Western and Eastern Cape.

*Cyanthillium Blume 8751050

(Vernonieae)

Blume: 889 (1826); Robinson: 250 (1990); Pope: 143 (1992); Bremer: 219 (1994); Isawumi: 11 (1995).

Vernonia sect. *Tephrodes* DC.: 24 (1836a). *Vernonia* subsect. *Tephrodes* (DC.) S.B.Jones: 70 (1981). *Seneciodes* L. ex Post & O.Kuntze: 515 (1903).

Annual or perennial herbs. **Leaves** alternate, subspathulate to broadly ovate or lanceolate in upper part, apex shortly acuminate or attenuate, narrowly petiolate. **Capitula** discoid, many in large terminal panicle. **Involucre** campanulate; bracts linear-lanceolate or subulate to lorate, often with greenish outer surface and purplish margins. **Disc flowers** bisexual; corolla pinkish or pale mauve, narrowly funnel-shaped, with 1 row of eglandular trichomes and capitate glands. **Anthers** calcarate; with ovate, obtuse or acute apical appendages; endothecial tissue with horizontal and radial walls thickened; filament collars narrowly cylindrical, elongate, straight and not wider than filaments. **Style** base conspicuously ring-like with cells thickened, cells ± rectangular, 1–5 in a row. **Cypselas** subfusiform, terete, not ribbed, narrowed below, uniformly strigulose pubescent; ovary wall crystals narrowly elongate, hexagonal in surface view and rectangular in side view. **Pappus** in 2 rows; outer of distinct, short, linear, fimbriate scales, sometimes 0; inner of white, barbellate, caducous bristles.

Species ± 3, tropical Africa, Madagascar, tropical Asia; 1 (introduced pantropical weed) in sthn Afr.: **Cyanthillium cinereum* (L.) H.Robinson, Northern Province and KwaZulu-Natal.

Cymbopappus B.Nord. 9341040

(Anthemideae)

Nordenstam: 150 (1976); Nordenstam: 147 (1987); Bremer & Humphries: 151 (1993); Bremer: 473 (1994).

Shrubs or subshrubs. **Leaves** alternate, closely set, linear-filiform, ericoid, entire or lobed-pinnatipartite, sometimes with additional lobes from leaf base ('pseudostipules'), subterete-flattened, herbaceous-coriaceous, pubescent-glabrescent, with impressed glands in hollows or furrows. **Capitula** radiate, solitary, terminal, pedunculate. **Involucre** hemispherical-cup-shaped; involucral bracts imbricate, ovate-oblong-lanceolate or spathulate, coriaceous with brownish membranous margins and tips, glandular and floccose-woolly or glabrescent. **Receptacle** convex-hemispherical or subconical, epaleate. **Ray florets** female, fertile, 9–21, white-pinkish; tube somewhat compressed, glandular; lamina 4(5)-veined, apically 3-fid. **Style** branches oblong, truncate. **Disc florets** bisexual, many, yellow; corolla regular, with somewhat spongy glandular tube and narrow 5-lobed limb. **Anthers** ecalcarate and ecaudate, with ovate-oblong, obtuse-subtruncate apical appendage; filament collar oblong, of subequal cells. **Style** fertile with truncate branches; base not much swollen, partly immersed in short and sometimes indistinct nectary. **Cypselas** oblong, terete or angular, usually 5-ribbed, glandular with broad sessile glands, with myxogenic cell layers, especially abaxially. **Pappus** an oblique, adaxially longer, white, scarious crown or cup; or of one large adaxial and one smaller abaxial scale, often shorter in disc florets.

Species 3, endemic to sthn Afr., Mpumalanga, Western and Eastern Cape, each species in a different province.

Cypselodontia DC. 9067000

(Not assigned to a tribe)

Candolle: 286 (1838b); Harvey: 123 (1865).

Subshrubs. **Leaves** alternate, few, 1-nerved, greyish villous beneath. **Capitula** radiate, solitary at ends of branches. **Involucral bracts** in many rows, imbricate, linear. **Receptacle** honeycombed, with margins of pits toothed. **Ray florets** neuter. **Style** branches obtuse, downy on back near apex. **Cypselas** glabrous, with ring of hairs at base. **Pappus** of few bristles at base. **Disc florets** bisexual and fertile. **Cypselas** obovate, villous, with rufous hairs. **Pappus** copious, of toothed bristles.

Monotypic, endemic to sthn Afr.: *Cypselodontia eckloniana* DC., Eastern Cape (Uitenhage District).

Note by E.G.H. Oliver at Kew: only a poor specimen in Candolle Herbarium, with a single flower head in fruit: hence description limited mainly to cypsela.

Delairea Lem. 9411090

(Senecioneae)

Lemaire: 379 (1844); Jeffrey: 933 (1986); Bremer: 500 (1994).

Senecio L. in part, Harvey: 402 (1865); Hilliard: 491 (1977).

Scandent, climbing, somewhat succulent, perennial herbs. **Leaves** alternate, petiolate, deltoid-ovate in outline, 3–5-lobed on either side, base cordate, auriculate, palmately veined. **Capitula** discoid, in corymbose panicles. **Involucre** calyculate, narrowly campanulate; bracts 8. **Disc florets** bisexual, fertile; corolla yellow. **Anthers** ecalcarate, caudate; endothecial tissue radial. **Cypselas** oblong, ribbed. **Pappus** of many fine bristles.

Monotypic, endemic to sthn Afr.: *Delairea odorata* Lem., KwaZulu-Natal, Lesotho, Western and Eastern Cape.

Denekia Thunb. 8949000

(Gnaphalieae)

Thunberg: 153 (1800); Harvey: 118 (1865); Wild: 134 (1969a); Hilliard: 117 (1977); Anderberg: 55 (1991a); Anderberg: 324 (1994).

Perennial herbs, favouring damp places. **Leaves** alternate, usually amplexicaul and whitish tomentose on lower surface, dentate. **Capitula** small, disciform, in loose corymbs. **Involucre** campanulate or subhemispherical; involucral bracts cartilaginous, in few rows; stereome undivided. **Receptacle** flat, epaleate. **Marginal florets** female, white or blue, bilabiate, in several rows. **Style** bifid, branches truncate with obtuse sweeping hairs apically; stigmatic surface separated. **Cypselas** subterete, sparsely hairy with elongated, not myxogenic, uncinate twin hairs; epidermis smooth. **Pappus** 0. **Disc florets** functionally male; corolla white or blue, funnel-shaped, 5-lobed, lobes retrofract. **Anthers** ecalcarate and ecaudate; endothecial tissue with wall thickenings on all walls; apical appendage concave, as wide as thecae. **Cypselas** reduced. **Pappus** of 1, apically plumose, capillary bristle.

Monotypic: *Denekia capensis* Thunb., widespread in *Flora zambesiaca* area and sthn Afr., but absent from Western Cape; extremely variable in size and pubescence.

Dichrocephala L'Hér. ex DC. 8866000

(Astereae)

Candolle: 517 (1833); Hilliard: 58 (1977); Fayed: 491 (1979); Bremer: 400 (1994).

Annual herbs. **Leaves** alternate, petiolate, oblong-obovate to linear-oblong in outline, dentate or lyrate-pinnatifid, lobes serrate, hairy on both sides. **Capitula** disciform, small, subglobose, in terminal panicles, pedunculate; peduncles bracteate. **Involucre** somewhat flattened or cup-shaped; bracts in ± 2 rows, equal, glabrous, oblong, with fimbriated, membranous margins. **Receptacle** hemispherical, epaleate. **Marginal florets** female, fertile, many, corolla whitish or yellow (rarely reddish), tubular, 2- or 3-denticulate, with few glands. **Disc florets** bisexual, fertile, fewer than marginal flowers, corolla yellowish green, tubular below, campanulate above, laxly glandular, with 4 triangular lobes. **Anthers** oblong, ecalcarate and ecaudate, with minute, triangular apical appendage. **Style** as long as corolla, with 2 short branches; appendages lanceolate. **Cypselas** obovate, slightly compressed, basically and apically with few glands, otherwise glabrous and shiny. **Pappus** usually 0 in ray florets, 0 or 1 or 2 caducous bristles in disc florets. $x = 9$ (6, 10—1 report each).

Species 4, tropical and subtropical Africa, Madagascar and Asia; 1 in sthn Afr.: *Dichrocephala integrifolia* (L.f.) Kuntze subsp. *integrifolia*, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Eastern Cape.

Dicoma Cass. 9501000

(Mutisieae)

Cassini: 12 (1817b); Oliver & Hiern: 442 (1877); Phillips: 850 (1951); Wild: 178 (1972); Hilliard: 582 (1977); Lawalrée & Mvukiyumwami: 151 (1982); Pope: 29 (1992); Bremer: 99 (1994).

Annual herbs or subshrubs with annual stems, erect or prostrate, often tomentose. **Leaves** alternate, occasionally subrosulate, sessile, usually discolorous, entire or serrulate or revolute. **Capitula** discoid, all florets bisexual; or disciform, outer florets neuter. **Involucre** subglobose or subcampanulate; bracts in many rows, pungent, glabrous. **Receptacle** flat, epaleate. **Florets** with corolla white or purple; tube of bisexual floret dilated above, deeply 5-lobed; neuter florets narrowly tubular, subbilabiate or subradiate. **Anthers** linear; bases sagittate produced into long, retrorse-ciliate tails; apical appendage lanceolate. **Style** terete, slightly swollen at base, bifid at apex, tips obtuse with minute sweeping hairs. **Cypselas** obovoid to obconical, ribbed, pilose. **Pappus** of various bristles and/or scales in several rows; bristles scabrid to barbellate to plumose, apically pilose. $x = 11$.

Species 35, tropical and sthn Afr., Madagascar, Sokotra, India; 19 in sthn Afr., widespread.

Didelta L'Hér. 9439000

(Arctoteae)

L'Héritier de Brutelle: 55 (1786); Harvey: 510 (1865); Burtt: 69 (1948); Roessler: 304 (1959); Phillips: 848 (1951); Bremer: 261 (1994).

Perennial herbs or subshrubs, glabrous or tomentose. **Leaves** alternate or opposite, sessile, entire or with few spinous teeth, ± fleshy. **Capitula** radiate; several-flowered, solitary, sessile or peduncled. **Involucre** flattened; bracts in 2 rows, outer row of 3–5 large, foliaceous, broadly ovate-triangular bracts, sometimes apiculate, inner row of several ovate-lanceolate bracts, sometimes with spinous margin. **Receptacle** flat, deeply pitted, at maturity breaking into 3–5 outer parts and 1 central part enclosing cypselas, outer parts adnate to 1 of outer involucral bracts, becoming thickened and lignified, central part membranous. **Ray florets** neuter; corolla yellow, tube rudimentary, with ± oblong, 4-toothed lamina; staminodes present. **Disc florets** bisexual, fertile; corolla yellow, tube somewhat campanulate above, with 5 ± linear-lanceolate lobes. **Anthers** sagittate at base, with lanceolate, apical appendage. **Style** terete, discoid at base, with linear, obtuse branches. **Cypselas** obconic, ribbed, pilose or glabrous. **Pappus** a crown of linear, acuminate, ciliate scales up to length of ovary.

Species 2: *Didelta carnosa* (L.f.) Aiton and *D. spinosa* (L.f.) Aiton, endemic to southern part of Namibia and the western parts of the Northern and Western Cape.

Dimorphotheca Vaill. ex Moench 9425000

(Calenduleae)

Moench: 585 (1794); Harvey: 417 (1865); Norlindh: 38 (1943); Nordenstam: 373 (1994).

Castalis Cass.: 331 (1824).

Annual or perennial herbs, subshrubs or shrubs. **Leaves** alternate, entire, toothed to pinnatipartite. **Capitula** radiate, small to large, many-flowered. **Involucre** campanulate; bracts in 1(2) row, free, linear, acuminate, sometimes with membranous margin. **Receptacle** flat or somewhat convex, epaleate. **Ray florets** female, fertile or sterile (rarely neuter); corolla white above and dark-coloured beneath, or yellow to orange or purple; tube with linear to obovate-oblong, obtuse or 3-toothed lamina 4–8 × as long as tube. **Staminodes** often present.

Style linear, with linear, obtuse branches, fertile or sterile, sometimes lacking. **Ray cypselas** (if present) triquetrous or subterete, sometimes ellipsoid or subglobose, straight or slightly curved, smooth or tuberculate or shortly winged, or with many wing-like protuberances. **Pappus** 0. **Disc florets** bisexual, fertile or functionally male; corolla yellow or purple, tube gradually widening above, with 5 lanceolate lobes, sometimes with foot-like appendage. **Anthers** linear, ecalcarate, shortly sagittate; with lanceolate or ovate apical appendage; endothecial tissue polarised. **Style** linear, shortly bilobed, with linear-oblong branches, with annular collar of hairs, with or without stigmatic areas. **Disc cypselas** (if present) laterally flattened with thickened margins, rounded or elliptic to obcordate or obovate in outline. **Pappus** 0. $x = 9$, 10 (B-chromosomes—1 report).

Species 19, sthn Afr., Angola and Zimbabwe; widespread.

Disparago Gaertn. 9039000

(Gnaphalieae)

Gaertner: 463, t. 173 (1791); Harvey: 277 (1865); Levyns: 95 (1936); Anderberg: 77 (1991a); Koekemoer: 197 (1993); Anderberg: 331 (1994).

Wigandia Neck.: 95 (1790) not of Kunth; Lessing: 362 (1832).

Shrublets or shrubs, usually profusely, sympodially branched, larger plants dense, erect or cushion-like and spreading; new shoots developing from below terminal inflorescences of previous season. **Leaves** alternate, small, filiform, oblong or obovate; adaxial surface villous, hairs unicellular; margins entire, involute; apex mucronate, apiculate or obtuse. **Synflorescence** terminal with capitula solitary, in small clusters or in very dense, globose, subglobose or cylindrical aggregations. **Capitula** 1–10-flowered; individual heads radiate or discoid, composed of strap-shaped and/or tubular flowers. **Involucral bracts** in 1–4 rows, chaffy, lacking a distinct stereome, broadly or narrowly cymbiform; apices acute or acuminate; margins entire, sometimes undulate or with clavate outgrowths. **Receptacle** small, conical. **Ray florets** 3-lobed, female or sterile, white or pink, strap-shaped. **Disc florets** 5-lobed, lobes erect or spreading star-like, male or bisexual, white or pink. **Anthers** apically lanceolate, basally tailed. **Style** bifid. **Nectary** present in tubular flowers. **Cypselas** fertile or sterile; small, symmetrical, with 5 or 10 vascular bundles, surface glabrous, puberulous or villous. **Pappus** present or 0, caducous or persistent, of 3–15(–20) plumose or barbed bristles, free or connate in a ring or tube at base. $x = 9$ (1 report).

Species 9, mainly in the fynbos of the Western Cape; inland boundaries of its distribution are along the mountains bordering the Karoo or the transition areas between fynbos and other biomes; *Disparago tortilis* (DC.) Sch.Bip., is more widely distributed and spreads along the south and east coast to Umtamvuna in KwaZulu-Natal, where it occurs in relict fynbos.

Distephanus Cass. 8751020

(Vernonieae)

Cassini: 151 (1817b); Robinson & Kahn: 498 (1986); Bremer: 220 (1994).

Gongrothamnus Steetz: 336 (1864); Merxmüller: 424 (1954a); Merxmüller: 84 (1967a).

Shrubs or scramblers, twigs herbaceous. **Leaves** alternate, ovate to lanceolate, acuminate, shortly petiolate, entire, glandular, lower surface sometimes thinly greyish tomentose. **Capitula** discoid, many, in dense, terminal, corymbose panicles. **Involucre** turbinate; bracts in several rows, imbricate, lanceolate, thinly pubescent. **Receptacle** shallowly honeycombed. **Corolla** yellow or orange, tubular, glandular. **Anthers** sagittate. **Style branches** filiform, somewhat acute, with relatively long hairs on back. **Cypselas** oblong-obovoid, generaly 10-ribbed, glabrous or pilose-sericeous. **Pappus** of many scabrid bristles; outer ones short, inner ones longer.

Species 24, palaeotropical; 4 in sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

***Dittrichia** Greuter 9061005

(Inuleae)

Greuter: 71 (1973); Anderberg: 104 (1991b); Anderberg: 286 (1994).

Cupularia Godr. & Gren.: 180 (1850) not of Link. *Inula* of other authors, not of L.

Annual or perennial herbs. **Leaves** alternate, sessile, lanceolate to linear, glandular, viscid, ± revolute or flat, entire or faintly denticulate, hairy. **Capitula** radiate, small, many together in rather dense terminal racemes. **Receptacle** epaleate, with scale-like ridges. **Involucre** cyathiform, involucral bracts cartilaginous, glandular. **Ray florets** female; corolla yellow, ± strap-shaped. **Disc florets** bisexual; corolla yellow, lobes short, smooth. **Anthers** ecalcarate, caudate, with branched tails; endothecial tissue polarised. **Style** with acute sweeping hairs, not reaching furcation. **Cypselas** ellipsoid, shorter than corolla, hairy, apically somewhat constricted, glandular; epidermis with elongated crystals. **Pappus** of barbellate, capillary bristles in 1 row, basally connate and concrescent into a cupule. $x = 9$.

Species 2, Mediterranean; 1 naturalised in sthn Afr.: **Dittrichia graveolens* (L.) Greuter, Western Cape.

Doellia Sch.Bip. emended Anderb. 8939010

(Pluecheeae)

Anderberg: 21 (1995); Anderberg: 162 (1991c); Anderberg: 299 (1994).

Perennial herbs or subshrubs. **Leaves** alternate, linear-oblong to oblong-lanceolate, dentate, serrate or almost entire, hairy or subglabrous, auriculate but not decurrent. **Capitula** disciform, campanulate, terminal, solitary or few together in lax corymb. **Involucral bracts** imbricate, narrowly linear. **Receptacle** flat, epaleate. **Marginal florets** female; corolla filiform, 3-lobed, yellow or purplish. **Disc florets** bisexual; corolla yellow or purplish, 5-lobed. **Anthers** calcarate and caudate; endothecial tissue radial. **Style** bifid; style branches with obtuse sweeping hairs reaching far below furcation. **Cypselas** oblong, sparsely hairy, with few conspicuous red resin ducts; epidermis cells without elongated crystals. **Pappus** of barbellate bristles in 1 row and small inconspicuous coroniform ridge.

Species 2, Africa, Arabia and Madagascar; 1 in sthn Afr.: *Doellia cafra* (DC.) Anderb., Namibia, Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Dolichothrix Hilliard & B.L.Burtt 9045020

(Gnaphalieae)

Hilliard & Burtt: 221 (1981); Anderberg: 71 (1991a); Anderberg: 331 (1994).

Woody plants usually stunted due to growing in rock crevices; main stems usually firmly anchored in crevice, with many secondary and tertiary branches, often appearing one-sided on specimens; very old plants may develop a woody base with many buds and dead stems; new growth white-woolly, greying with age; secondary stems branching copiously from below capitulum of previous season, woolly-hairy; branches foliaceous

throughout. **Leaves** small, scale-like, tightly appressed, not more than 2 mm long and just as wide, surface appearing shiny, very densely glandular. **Capitula** discoid, solitary or 2–4 terminal on branches, 24–28-flowered, spreading funnel-shaped from a narrow base. **Involucral bracts** 48–52, in several rows, white, not translucent, reflexed in upper third, tips opaque, milky-white. **Receptacle** flat, honeycombed. **Flowers** tubular, ± 3.5 mm long, scarcely widening at tip, lobes pilose outside, often reddish. **Anthers** basally tailed, apical appendages acuminate. **Style** bifid, basally swollen, branches slightly rounded. **Nectary** 0. **Cypsela** very densely hairy with twin hairs, hairs white, straight, with 5 narrow ribs. **Pappus** of 18–24 flattened bristles, fused in a ring at base, barbed to shortly plumose throughout, hairs fused into a flat tip with hair apices rounded and inflated.

Monotypic: *Dolichothrix ericoides* (Lam.) Hilliard & B.L.Burtt endemic to Western and Eastern Cape.

Dymondia Compton 9432050

(Arctoteae)

Compton: 110 (1953); Bremer: 260 (1994).

Perennial herbs with shallow rhizomes producing short, matted, leafy branchlets. **Leaves** alternate, spreading, linear-oblanceolate, entire or sinuate-dentate, glabrous on upper surface and whitish woolly on lower. **Capitula** radiate, solitary, sessile, subterminal. **Involucre** campanulate; bracts in several rows, woolly on back of tip. **Receptacle** slightly convex, producing white hairs and paleae round base of cypselas. **Ray florets** strap-shaped, female, fertile; corolla yellow; style short, with ovate-strap-shaped branches. **Disc florets** bisexual; corolla yellow, tubular, expanded above. **Style** swollen above, bifid, minutely hairy on swollen portion. **Cypselas** glabrous. **Pappus** of 2 rings of short, ovate-acuminate, laciniate, hyaline scales.

Monotypic: *Dymondia margaretae* Compton is endemic to the Bredasdorp District (Western Cape).

*Eclipta L. 9166000

(Heliantheae)

Linnaeus: 157 (1771); Oliver & Hiern: 373 (1877); Harvey: 131 (1865); Phillips: 814 (1951); Wild: 9 (1967); Hilliard: 303 (1977); Karis & Ryding: 583 (1994).

Annual or perennial herbs, diffuse or erect, ± strigose pubescent or hirsute. **Leaves** opposite, sessile or shortly petiolate, lanceolate-linear, entire or remotely toothed. **Capitula** radiate, small, few-flowered, pedunculate, solitary or in pairs in upper leaf axils. **Involucre** campanulate or hemispherical. **Receptacle** flat or convex; paleae longer than florets, boat-shaped, ribbed, sometimes 0 from centre of disc. **Ray florets** female or sterile; corolla white; tube somewhat compressed, much shorter than lamina, glabrous; lamina oblong-elliptic, truncate, entire or 2- or 3-toothed, ciliate above, glandular-pilose on back of base. **Style** shortly bifid. **Cypselas** oblong, 3-angled. **Pappus** a ring of delicate hairs. **Disc florets** bisexual; corolla white, tubular below, campanulate above, shortly 4- or 5-lobed. **Anthers** linear, obtuse at base, with ovate to round apical appendage. **Style** oblong, apex deltoid, papillose outside. **Cypselas** oblong, ± compressed. **Pappus** a ring of fine minute hairs or 0. $x = 11$ (9, 10, 12) (aneuploids).

Species 4, pantropical; 1 in sthn Afr.: **Eclipta prostrata* (L.) L., a cosmopolitan weed from Asia, occurring in Namibia, Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Edmondia Cass. 9006020

(Gnaphalieae)

Cassini: 75 (1818); Hilliard & Burtt: 216 (1981); Hilliard: 314 (1983); Anderberg: 153 (1991a); Anderberg: 356 (1994).

Aphelexis D.Don: 546 (1826). *Helipterum* section *Edmondia* (Cass.) DC.: 214 (1838a). *Helichrysum* section *Edmondia* (Cass.) Harv.: 219, 255 (1865).

Perennial herbs or shrublets, sprawling, ascending or erect, stout, closely leafy throughout. **Leaves** alternate, rigid, ascending, erect or appressed, imbricate, subulate to linear-lanceolate, often rounded abaxially, often long on vegetative shoots, short on flowering shoots, often bract-tipped below involucre, base broad, clasping, margins entire, strongly involute and hiding upper surface in long leaves, flat in short leaves, white-tomentose above (hair type B), glabrous and shining below. **Capitula** discoid or disciform, broadly campanulate, large, often solitary at branch tips, or rarely 2 to several. **Involucral bracts** in many rows, loosely imbricate, radiating, inner much exceeding florets, white, pink or yellow, outer sometimes pale dark brown; stereome divided. **Receptacle** flat, epaleate, fimbrilliferous. **Flowers** ± 85–315, 0–19 female; corolla of female flowers narrowly tubular or filiform; of bisexual flowers campanulate above, 5-lobed; all flowers glandular-hairy on backs of lobes. **Anthers** ecalcarate, caudate, tails ± equalling filament collar; with lanceolate apical appendage; endothecial tissue polarised; staminodes often present in female flowers. **Style** branches truncate and penicillate with obtuse sweeping hairs. **Cypselas** either terete with myxogenic duplex hairs, or (*E. pinifolia*) flattened, winged, glabrous. **Pappus** bristles shortly plumose above, barbellate below, fused at base in smooth ring, also cohering by small patent cilia.

Species 3; endemic to sthn Afr., Western Cape.

Elytropappus Cass. 9041000

(Gnaphalieae)

Cassini: 199 (1816); Lessing: 342 (1832); Harvey: 273 (1865); Bentham: 323 (1873a); Levyns: 89 (1935); Anderberg: 75 (1991a); Anderberg: 331 (1994).

Cyathopappus Sch.Bip.: 27 (183) (1861). *Achyrocome* Schrank: 147, 170 (1824).

Shrubs or subshrubs, glandular. **Leaves** usually small and ericoid, involute, margins entire, covered with matted hairs. **Synflorescences** in spikes, panicles or globose heads, terminal. **Capitula** discoid, 1–6-flowered. **Involucral bracts** imbricate in few rows, inner scarious, outer sometimes woolly hairy, often leafy. **Receptacle** conical, small, naked. **Florets** tubular, usually inconspicuous, 5-lobed, lobes erect or spreading. **Anthers** apically acuminate, basally tailed. **Style** bifid, branches pencilled at summit. **Nectary** 0. **Cypselas** small, terete or subterete, often with a well-developed annulus, surface glabrous, or short-hairy, with longitudinal or transverse ribs. **Pappus** bristles several, plumose at tip and usually fused in a ring at base.

Species 8, endemic to sthn Afr., centre of distribution in Western Cape, *Elytropappus rhinocerotis* (L.f.) Less. extending to Northern and Eastern Cape.

Emilia Cass. 9411010

(Senecioneae)

Cassini: 68 (1817b); Oliver & Hiern: 405 (1877); Merxmüller: 55 (1967a); Jeffrey: 908 (1986); Bremer: 501 (1994).

Pseudactis S.Moore: 118 (1919).

Annual or perennial, mostly glabrous herbs. **Leaves** alternate, radical or cauline, entire to variously lobed,

sometimes petiolate, sometimes amplexicaul or basally auriculate. **Capitula** discoid, usually corymbose, pedunculate. **Involucre** ecalyculate, cylindric or campanulate; bracts in 1 row. **Receptacle** epaleate. **Disc florets** bisexual; corolla tubular, orange, red, pink, purple, violet or white. **Anthers** ecalcarate and ecaudate; endothecial tissue radial. **Style** branches truncate to obtuse, sometimes with appendages of fused papillae. **Cypselas** oblong, mostly ribbed, glabrous or pubescent. **Pappus** of many fine bristles. $x = 5$ (6, 8—1 report each) (polyploidy).

Species ± 90, tropical Africa and Asia; 6 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland and KwaZulu-Natal.

Engleria O.Hoffm. 8861000

(Astereae)

Hoffmann: 273 (1889a); Merxmüller: 56 (1967a); Bremer: 403 (1994).

Annual or perennial herbs, erect or decumbent. **Leaves** opposite or upper subopposite, petiolate, ovate. **Capitula** radiate or discoid, axillary and solitary, on long peduncles or aggregated into cymes, sometimes radiate, several-flowered. **Involucre** campanulate; bracts in 6–many rows, 1-nerved, with membranous margin. **Receptacle** convex, honeycombed, with margin slightly produced. **Ray florets** female, yellow. **Disc florets** bisexual. **Corolla** with tube gradually widening upwards; lobes ovate. **Anthers** linear, obtuse or obtusely lobed at base; with ovate, membranous, apical appendage. **Style** terete, with branches usually lanceolate at hairy apex. **Cypselas** obovoid, somewhat compressed, 2- or 4-ribbed with resin sacs in ribs, hirsute. **Pappus** in 2 rows, of scabrid, barbellate or subpilose bristles, often connate at base.

Species 2, Angola, sthn Afr.: *Engleria africana* O.Hoffm. and *E. decumbens* (Welw. ex Hiern) Hiern, Namibia.

Enydra Lour. 9164000

(Heliantheae)

Loureiro: 510 (1790); Oliver & Hiern: 372 (1877); Wild: 35 (1967); Hilliard: 302 (1977); Karis & Ryding: 610 (1994).

Erect or prostrate, marsh or aquatic herbs. **Leaves** opposite, sessile or subsessile, simple, lanceolate, margins entire or remotely denticulate. **Capitula** radiate, axillary, sessile or shortly pedunculate. **Involucral bracts** 4, leafy, in 2 rows of opposite pairs. **Receptacle** convex or conical; paleae sheathing florets. **Ray florets** female; corolla pale yellowish, strap-shaped, short and broad. **Style** branches linear. **Disc florets** bisexual or functionally male; corolla pale yellowish, tubular, widening above, 5-lobed. **Anthers** with deltoid apical appendage, bases obtuse. **Style** branches oblong, flattened, truncate and shortly penicillate, with minute sweeping hairs outside and marginal stigmatic papillae. **Cypselas** surrounded by persistent paleae, usually somewhat compressed. **Pappus** 0. $x = 11$ (1 report).

Species 10, pantropical; 1 in sthn Afr.: *Enydra fluctuans* Lour., KwaZulu-Natal.

Eremothamnus O.Hoffm. 9373000

(Eremothamneae)

Hoffmann: 278, t. 9b (1889a); Merxmüller: 58 (1967a); Leins: 369 (1970); Bremer: 69 (1994).

Small shrubs, woolly. **Leaves** alternate, obovate, entire or apically 3–5-dentate, spine-tipped, fleshy. **Capitula** radiate, solitary, sessile, terminal, many-flowered. **Involucre** campanulate; bracts in several rows, chartaceous, glabrous, spine-tipped. **Receptacle** areolate, epaleate. **Ray florets** female, fertile; corolla yellow; tube with oblong-elliptic, 3-toothed lamina shorter than tube; staminodes present. **Disc florets** bisexual; corolla yellow, tube widening above, deeply 5-lobed, with linear lobes. **Anthers** calcarate and caudate; with linear, apical appendage. **Style** slender, with long style branches, with short 2- or 3-celled hairs along branches and on shaft. **Cypselas** oblong-obovoid, densely sericeous. **Pappus** of stout, scabrid-barbellate bristles.

Monotypic, endemic to sthn Afr.: *Eremothamnus marlothianus* O.Hoffm., Namibia.

*__Erigeron__ L. 8901000

(Astereae)

Linnaeus: 863 (1753); Harvey: 86 (1865); Henderson & Anderson: 360 (1966); Hilliard: 67 (1977); Bremer: 420 (1994).

Perennial herbs, prostrate. **Leaves** alternate, entire or dentate, narrowly elliptic. **Capitula** radiate, solitary, corymbose or paniculate, pedunculate. **Involucre** hemispherical or campanulate; bracts in several rows, linear, often hairy. **Receptacle** flat or slightly convex, epaleate. **Ray florets** female, in 1, rarely 2, rows; corolla pinkish or white; tube cylindric, with short narrow, bifid lamina. **Disc florets** few, bisexual, rarely functionally male, fertile; corolla yellow, tube cylindric, sometimes slightly widened above, 5(4)-lobed. **Anthers** ecalcarate and ecaudate; with linear-lanceolate, apical appendage. **Style** branches narrowly oblong, flattened, tip triangular with short pollen-sweeping hairs outside. **Cypselas** oblong, compressed, usually margined, glabrous or pubescent. **Pappus** bristles few or copious, in 2 ± distinct rows. $x = 9$ (8, 13) (aneuploids, high polyploidy, B-chromosomes).

Species ± 200, North and South America, Eurasia; 1 naturalised in sthn Afr.: **Erigeron karvinskianus* DC., Northern Province, Gauteng, Mpumalanga, Swaziland and Western Cape.

Eriocephalus L. 9320000

(Anthemideae)

Linnaeus: 926 (1753); Harvey: 200 (1865); Merxmüller: 58 (1967a); Müller: 155 (1988); Bremer & Humphries: 160 (1993); Bremer: 473 (1994).

Many-stemmed, sparsely to much-branched erect to spreading, sometimes spinescent, shrubs, silky-greyish, villous or occasionally glabrous, aromatic. **Leaves** ericoid, mostly opposite but sometimes alternate, often fascicled, entire or pinnatisect with 1–7 linear lobes. **Capitula** radiate or disciform, small, sessile to pedunculate, solitary, racemose, umbellate racemose, or in spikes. **Involucre** subglobose; bracts in single row of 4–6 bracts, often with broad membranous margin, pubescent to glabrous. **Receptacle** paleate; paleae linear or lanceolate, those of marginal flowers totally or partially connate or totally free from each other, hard and thick or transparent membranous, woolly. **Marginal florets** 2 or 3, female, fertile; with or without strap-shaped lamina, corolla yellow, white or reddish, 2–4-toothed or -lobed lamina. **Style** terete with 2 linear, acute branches. **Cypselas** oblong-linear to narrowly obovate, slightly flattened, sometimes slightly angular, lanate or pilose. **Pappus** 0. **Disc florets** functionally male, corolla tubular, slightly widened, trumpet-shaped to infundibuliform, 5-lobed. **Anthers** ecalcarate and ecaudate; with lanceolate, apical appendage; endothecial tissue polarised. **Style** cylindrical, unbranched, apex globose with sweeping hairs, rarely 2-lobed. $x = 9$ (polyploidy).

Species ± 32, endemic to sthn Afr.; widespread, but absent from Gauteng, Swaziland and KwaZulu-Natal.

Erlangea Sch.Bip. 8740000

(Vernonieae)

Schultz 'Bipontinus': 34 (1853); Oliver & Hiern: 265 (1877); Merxmüller: 62 (1967a); Wild & Pope: 362 (1977); Bremer: 220 (1994).

Haarera Hutch. & E.A.Bruce: 96 (1932).

Annual or perennial, erect herbs. **Leaves** alternate, sessile or subsessile; blade ovate-lanceolate to linear-oblong, crenate, serrate or almost entire, minutely pellucid-dotted, glabrous or hairy. **Capitula** discoid, with many florets, broadly campanulate to hemispheric, rather long-pedunculate, in lax terminal cymes. **Involucre** with bracts in ± 3 rows. **Receptacle** minutely reticulate-foveolate, ± plane. **Corolla** purple, narrowly funnel-shaped, 5-dentate, lobes with apical tuft of hairs. **Anthers** shortly sagittate; with lanceolate, membranous apical appendage. **Style** branches filiform, subulate, hirsute, exserted. **Cypselas** 4- or 5-angled, 4- or 5-ribbed, oblong-obovoid, rounded at apex; pitted and glandular between ribs, ± pilose on ribs. **Pappus** of few shortly hairy, caducous bristles. $x = 10$.

Species ± 6, tropical Africa; 2 in sthn Afr.: *Erlangea misera* (Oliv. & Hiern) S.Moore, Namibia, Botswana, North-West, Northern Province and Northern Cape and *E. remifolia* Wild & Pope, Botswana.

***Ethulia** L.f. 8734000

(Vernonieae)

Linnaeus f.: 1 (1762); Harvey: 47 (1865); Oliver & Hiern: 262 (1877); Merxmüller: 63 (1967a); Hilliard: 24 (1977); Gilbert & Jeffrey: 167 (1989); Bremer: 220 (1994).

Hoehnelia Schweinf.: 861 (1892).

Annual or rarely short-lived, perennial herbs. **Leaves** alternate, shortly petiolate, ovate-lanceolate to linear, entire or serrate. **Capitula** discoid; several- to many-flowered, in much-branched corymbs. **Involucre** campanulate or subhemispherical; bracts herbaceous, in 3 to many rows, imbricate, acute or obtuse. **Receptacle** flat, epaleate. **Corolla** mauve or purple; tube cylindric below, shallowly campanulate above; lobes 5, lanceolate, longer than campanulate part of tube. **Anthers** obtuse at base; with short, ovate, membranous apical appendage. **Style** branches filiform, subulate; pollen-sweeping hairs relatively long, exserted. **Cypselas** oblong-obconical, usually strongly 2–6-ribbed, glandular or rarely sparsely pilose between ribs and with thickened apical rim. **Pappus** 0. $x = 10$ (8—1 report) (aneuploids, polyploidy).

Species 19, tropical Africa and less commonly in tropical Asia; the widespread weedy species **Ethulia conyzoides* L.f., is the only introduced representative in sthn Afr, recorded from the Northern Province, Mpumalanga and Gauteng.

Eumorphia DC. 9323000

(Anthemideae)

Candolle: 2 (1838a); Harvey: 153 (1865); Grierson: t. 608 (1972); Källersjö: 538 (1985); Bremer & Humphries: 94 (1993); Bremer: 448 (1994).

Shrubs or shrublets, glabrous or pubescent. **Leaves** opposite, rarely alternate, ericoid, sometimes clustered, entire or lobed. **Capitula** radiate, terminal, solitary, rarely corymbose, shortly pedunculate or subsessile. **Involucre** campanulate to subglobose; bracts in 3–5 rows, outer sometimes with 2–5 glands on back near apex, inner ciliate near apex, sometimes all with broad, membranous apex. **Receptacle** flat or convex, rarely conical, paleate or sometimes epaleate; paleae longer than disc florets, linear, sometimes with bent, apical appendage. **Ray florets** female, fertile; corolla white, tube with oblong to linear, 3-toothed lamina 2–4 times as long as tube, glandular. **Disc florets** bisexual, fertile; corolla tube sometimes campanulate above, with 5 ovate lobes. **Anthers** ecalcarate and ecaudate, with linear, apical appendage; endothecial tissue polarised. **Style** linear, with linear, truncate branches. **Cypselas** 10–12-ribbed, rarely up to 18-ribbed, minutely papillose especially on ribs, with apical rim. **Pappus** 0.

Species 6, endemic to sthn Afr., Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Western and Eastern Cape.

Euryops (Cass.) Cass. 9417000

(Senecioneae)

Cassini: 49 (1820a); Harvey: 408 (1865); Nordenstam: 36 (1968); Bremer: 501 (1994).

Ruckeria DC.: 483 (1838a). *Lasiocoma* Bolus: 390 (1906). *Thodaya* Compton: 323 (1931). *Lysichlamys* Compton: 118 (1943).

Shrubs or shrublets, seldom perennial or annual herbs. **Leaves** alternate, sessile, lax or closely set, sometimes appearing rosulate or fascicled, entire, serrate-dentate or pinnatifid. **Capitula** radiate or discoid, lateral or pseudoterminal on unbranched peduncles. **Involucre** ecalyculate, hemispherical, campanulate, cyathiform or urceolate; bracts in 1 or ± 2 rows, connate to various degrees, rarely free. **Receptacle** flat or convex, honeycombed or rarely smooth, epaleate. **Ray florets** rarely 0, female, fertile; tube cylindrical; lamina yellow, orange-coloured or red to coppery on lower surface. **Staminodes** occasionally present. **Disc florets** bisexual, fertile or rarely functionally male; corolla yellow, tubular to campanulate, (3–)5-lobed. **Stamens** 5; anthers linear, ecalcarate and ecaudate to subacute at base; with flat, apical appendage; endothecial tissue radial. **Style** terete or linear, bifid or sometimes simple; style branches linear, truncate, penicillate at apex. **Cypselas** ellipsoid, glabrous or pubescent, ribbed or smooth or sometimes tuberculate or muricate or papillate. **Pappus** of few to many caducous bristles or 0; bristles flexuous, barbellate. $x = 10$ (polyploidy, B-chromosomes).

Species 97, Africa, 1 extending to the Arabian Peninsula and Socotra; 89 in sthn Afr., widespread.

***Facelis** Cass. 8986000

(Gnaphalieae)

Cassini: 94 (1819b); Bentham: 304 (1873a); Cabrera: 151 (1963); Hilliard: 4 (1983); Anderberg: 164 (1991a); Anderberg: 357 (1994).

Tufted annual herbs. **Leaves** alternate, spathulate, ± truncate, mucronate, sessile, lower surface white-woolly, (hair type B), eglandular; margin flat, entire. **Capitula** disciform, cylindric, solitary or crowded at ends of branches. **Involucral bracts** in several rows, papery, brownish, transparent; stereome undivided. **Receptacle** smooth, flat, epaleate. **Marginal florets** female, outnumbering disc florets; corolla filiform, purple. **Disc florets** bisexual; corolla purple, narrowly tubular, lobes erect, with hairs on back. **Anthers** ecalcarate, caudate with short tails ± equalling filament collar, with acute apical appendage; endothecial tissue polarised. **Style** bifid; style branches narrowly linear, pointed, with obtuse sweeping hairs extending to point of division. **Cypselas** turbinate, villous with elongated, not myxogenic twin hairs, hairs unicellular with thickened walls and basal cushion; epidermis smooth. **Pappus** bristles plumose, bases connate in ring. $x = 7$ (1 report, polyploidy).

Species 3, South America; 1 naturalised in sthn Afr.: **Facelis retusa* (Lam.) Sch.Bip., KwaZulu-Natal and Eastern Cape.

Felicia Cass. 8919000

(Astereae)

Cassini: 165 (1818) name conserved; Levyns: 768 (1950); Merxmüller: 417 (1954a); Merxmüller: 66 (1967a); Grau: 255 (1973); Hilliard: 68 (1977); Bremer: 420 (1994).

Aster L. in part, Harvey: 69 (1865); Phillips: 782 (1951). *Charieis* Cass.: 68 (1817b); Grau: 255 (1973), genus proposed for rejection.

Annual or perennial herbs or shrublets. **Leaves** alternate, opposite, or in basal rosette, sometimes tufted, mostly entire, rarely toothed, often linear to lanceolate, pubescent or rarely glabrous. **Capitula** radiate, rarely discoid, mostly solitary, terminal, pedunculate. **Involucre** hemispherical to campanulate; bracts in 3 or 4 rows, imbricate, unequal or strictly in 2 rows, equal. **Receptacle** flat, epaleate. **Ray florets** female, fertile or rarely sterile, in 1 row, strap-shaped; corolla blue, mauve, pink or white, rarely yellow; 0 in 1 species. **Staminodes** sometimes present. **Disc florets** bisexual, fertile, rarely all inner ones functionally male, tubular, slightly dilated above, 5-lobed, yellow. **Anthers** ecalcarate and ecaudate; apical appendage triangular. **Style** branches narrowly oblong, apex with triangular appendage, with conspicuous pollen-sweeping hairs. **Cypselas** compressed, obovate with thickened margins, mostly hairy, bright brown or black. **Pappus** in 1 row, of persistent or caducous scabrid or barbellate bristles, rarely 0 in ray florets. $x = 9$ (5, 6, 8) (polyploidy).

Species 83, sthn Afr. to Nigeria, Ethiopia and Saudi Arabia; 78 in sthn Afr., widespread.

***Flaveria** Juss. 9282000

(Helenieae)

Jussieu: 186 (1789); Phillips: 819 (1951); Hilliard: 324 (1977); Karis & Ryding: 542 (1994).

Annual, erect herbs, sometimes becoming woody at base, glabrous or minutely puberulous. **Branches** divaricate, leafy. **Leaves** opposite, sessile, simple, lanceolate to elliptic, margin entire or toothed. **Capitula** discoid, few-flowered, often sessile, corymbose or in axillary glomerules. **Involucre** ± cylindric; bracts 2–4 in 1 row, sometimes subtended by 1 or 2 smaller ones. **Receptacle** epaleate. **Disc florets** bisexual, corolla yellow, tubular below, turbinate-campanulate above, 5-toothed. **Anthers** with bases obtuse; apical appendage oblong. **Style** branches oblong, truncate, minutely penicillate. **Cypselas** elliptic, narrowing slightly to base, 10-ribbed. **Pappus** 0. $x = 9$ (polyploidy).

Species 21, Central and South America, Mexico, Australia; 1 in sthn Afr.: **Flaveria bidentis* (L.) Kuntze, introduced from America and now a widespread weed in South Africa and Swaziland.

Foveolina Källersjö 9366040

(Anthemideae)

Källersjö: 316 (1988); Bremer & Humphries: 155 (1993); Bremer: 474 (1994).

Matricaria L.: 891 (1753), in part excluding type. *Pentzia* Thunb.: 145 (1800), in part excluding type. *Gastrosulum* Sch.Bip.: 29 (1844), section *Gastrolepis* Sch.Bip.

Pubescent annual herbs. **Leaves** alternate, bipinnatisect. **Capitula** discoid, disciform or radiate, solitary, pedunculate. **Involucre** hemispherical or spherical; bracts in 3–5 rows, apically obtuse, with scarious margins, with or without central resin canal. **Receptacle** flat to convex-conical, epaleate. **Ray florets**, if present, female, fertile, white. **Cypselas** white, adaxially ± flat or inconspicuously 3-ribbed, without or with very few myxogenic cells, but with 2 lateral rows of short-stalked glands, immersed in small cavities, abaxially rounded and covered with myxogenic cells; pericarp spongy, containing abundance of druses, several cell-layers thick adaxially, but very thin and almost transparent abaxially, thus revealing dark brown colour of testa. **Pappus** white and spongy, coroniform, or more often an adaxial auricle. **Marginal florets** of disciform capitula female, fertile, 2-lobed, almost filiform. **Cypselas** ± terete, tapering at both ends, conspicuously rugose with short-stalked glands scattered all over, but without myxogenic cells; pericarp spongy and containing druses. **Pappus** 0. **Disc florets** bisexual, 4- or 5-lobed, number of lobes varying within same species; corolla tube of thin texture, often dilated at base; limb campanulate, partly enervate. **Anthers** ecalcarate and ecaudate. **Style** branches with or without resin ducts. **Cypselas** of 2 kinds, either as in rays, or, in some species, obovoid with thin pericarp all around, myxogenic especially abaxially. **Pappus** 0.

Species 5, endemic to sthn Afr., Namibia, Northern and Western Cape.

***Gaillardia** Foug. 9306000

(Helenieae)

Fougeroux: 55 (1788); Hilliard: 327 (1977); Karis & Ryding: 552 (1994).

Erect, branched, annual herbs, softly pubescent. **Leaves** alternate, usually sessile, oblong or spathulate, margins entire, toothed or lobed. **Capitula** radiate; several-flowered, usually solitary on long, nude peduncles, terminating branches. **Involucre** broad; bracts in 2 or 3 rows, usually becoming reflexed. **Receptacle** globose or reflexed. **Ray florets** neuter, rarely female and fertile; corolla yellow or crimson, often bicoloured, strap-shaped, rarely irregularly enlarged. **Disc florets** bisexual; corolla yellow or purplish, tubular below, campanulate above, 5-toothed. **Anthers** with bases eared or minutely sagittate; apical appendage acuminate. **Style** linear, truncate, penicillate; usually with long or short, hairy, subulate appendage. **Cypselas** obpyramidal, 4- or 5-angled, often ribbed. **Pappus** of 5, awned scales. $x = 17$ (9, 19) (aneuploids, high polyploidy).

Species 28, North and South America; 1 naturalised in parts of sthn Afr.: **Gaillardia pulchella* Foug., especially in KwaZulu-Natal, also known from North-West, Free State and Eastern Cape.

Galeomma Rauschert 8987010

(Gnaphalieae)

Rauschert: 557 (1982); Hilliard: 13 (1983); Anderberg: 135 (1991a); Anderberg: 357 (1994).

Eriosphaera Less.: 270 (1832); Harvey: t. 149 (1863); Harvey: 264 (1865); Bentham: 321 (1873a); Hilliard & Burtt: 211 (1981).

Prostrate woolly annual herbs. **Leaves** alternate, spathulate or oblong-spathulate, sessile, tomentose (hair type B), eglandular, margins flat, entire. **Capitula** discoid or disciform, in terminal glomerules embedded in wool. **Involucral bracts** in few rows, tip of lamina very acute to acuminate, whitish or pale straw-coloured; stereome divided. **Receptacle** honeycombed, flat, epaleate. **Flowers** 11–125, female, if present, outnumbering bisexual, corolla yellow, with hairs on backs of erect lobes. **Anthers** ecalcarate, caudate with short tails; apical appendage flat, as wide as thecae; endothecial tissue polarised. **Style** bifid; style branches truncate and penicillate with obtuse sweeping hairs apically; stigmatic surface separated. **Cypselas** oblong, with common duplex hairs, myxogenic or not. **Pappus** bristles either very few, nude below with apical tuft of much inflated cells, or many, evenly barbed with ± patent cilia tending to intermingle.

Species 2, endemic to sthn Afr.: *Galeomma oculus-cati* (L.f.) Rauschert and *G. stenolepis* (S.Moore) Hilliard, Namibia, Botswana and Northern Cape.

*Galinsoga Ruiz & Pav. 9246000

(Heliantheae)

Ruiz & Pavón: t. 24 (1794); Phillips: 819 (1951); Wild: 9 (1967); Hilliard: 322 (1977); Karis & Ryding: 607 (1994).

Annual herbs, glabrous or pilose. **Leaves** opposite, petiolate, ovate, sometimes faintly crenate on margins. **Capitula** radiate, pedunculate, in small cymes, terminal or axillary. **Involucre** broadly campanulate or hemispherical; bracts in 1 or 2 rows, ovate, membranous. **Receptacle** conical, paleate; paleae flat, membranous. **Ray florets** female, fertile; corolla white, strap-shaped. **Disc florets** bisexual, fertile; corolla yellow, cylindric, 5-toothed. **Anthers** oblong, bases faintly sagittate, with suborbicular apical appendages. **Style** linear; branches of ray florets linear-lanceolate, of disc florets linear-lanceolate with small subulate terminal appendage, papillose on outer faces. **Cypselas** of ray florets obconical or obpyramidal, usually dorsiventrally compressed, enclosed by group of connate involucral bracts and palea; of disc florets obconical and obpyramidal or subterete, 4- or 5-angled. **Pappus** 0 or of linear or narrowly ovate, fimbriate, lacinate or aristate scales. x = 8 (9) (aneuploids, high polyploidy).

Species 13, North, Central and South America; **Galinsoga ciliata* (Raf.) S.F.Blake and *G. parviflora* Cav., introduced weeds in sthn Afr., both widespread.

*Gamochaeta Wedd. 8992060

(Gnaphalieae)

Weddell: 151 (1856); Anderberg: 155 (1991a); Anderberg: 357 (1994).

Gnaphalium L., in part, excl. type; Hilliard: 17 (1983).

Annual or perennial herbs. **Leaves** alternate, sessile, tomentose (hair type B), eglandular, margin flat, entire. **Capitula** disciform, small, inconspicuous, in head-like clusters or in ± elongated spikes. **Involucral bracts** papery, brownish, transparent; stereome undivided. **Receptacle** flat, epaleate. **Female florets** purple, filiform, pistillate, outnumbering disc florets. **Disc florets** bisexual; corolla purple, corolla lobes erect. **Anthers** ecalcarate, caudate with short tails; apical appendage flat, as wide as thecae; endothecial tissue polarised. **Style** bifid; style branches truncate with obtuse sweeping hairs apically; stigmatic surface separated. **Cypselas** small, oblong, with globose, myxogenic twin hairs; epidermis smooth. **Pappus** of barbellate, capillary bristles in 1 row, deciduous as unit, basally connate; apical cells not clavate. x = 10 (1 report, polyploidy).

Species 52, mainly South America, but also in other parts of the world; 5 naturalised in sthn Afr., widespread but absent from Namibia, Botswana and Northern Cape.

Garuleum Cass. 9426000

(Calenduleae)

Cassini: 172 (1819d); Harvey: 92 (1865); Norlindh: 33 (1943); Nordenstam: 375 (1994).

Perennial herbs, shrublets or shrubs, sometimes viscid, scabrid, or pilose. **Leaves** alternate, pinnatifid or toothed, sometimes pungent, sessile. **Capitula** radiate, solitary or corymbose, terminal, pedunculate. **Involucre** hemispherical-campanulate with imbricate bracts in 2 or 3 rows, ovate to linear, usually ciliate, sometimes reflexed and sometimes pungent. **Receptacle** convex, epaleate. **Ray florets** female, fertile; corolla blue, purple, mauve, white or yellow; tube with linear or oblong, 3-toothed lamina up to 3 × its length. **Style** linear, with linear, subacute branches. **Ray cypselas** triquetrous or somewhat compressed with entire or crenate angles, glabrous. **Pappus** 0. **Disc florets** bisexual or functionally male; corolla yellow; tube subcampanulate above, with 5 lanceolate lobes, sometimes hairy on back. **Anthers** ecalcarate, faintly eared at base; with ovate, apical appendage; endothecial tissue polarised. **Style** terete or linear, deeply bifurcate with linear lobes, covered with acute papillae (hairs) to well below point of bifurcation. **Disc cypselas** (develop in 1 species only) obovate or obcordate in outline, flattened, marginally winged with thickened rim, glabrous. **Pappus** 0.

Species 8, endemic to sthn Afr., widespread but absent from Botswana, Northern Province, North-West and Swaziland.

Gazania Gaertn. 9434000

(Arctoteae)

Gaertner: 451 (1791); Harvey: 471 (1865); Oliver & Hiern: 427 (1877); Phillips: 845 (1951); Roessler: 365 (1959); Hilliard: 543 (1977); Bremer: 261 (1994).

Perennial or rarely annual herbs, usually tufted from base, with milky latex. **Leaves** alternate sometimes rosulate, rarely with distinct petiole, entire to pinnately lobed, usually white-woolly on lower surface. **Capitula** radiate, few- to many-flowered, solitary, pedunculate. **Involucre** urceolate or campanulate; bracts in many rows, connate below to form cup and intrusive at base. **Receptacle** somewhat convex or conical, epaleate. **Ray florets** in 1 row, neuter; corolla yellow, golden or reddish, often with greenish or blackish spot at base, strap-shaped, tube flatttened, with ± oblong-elliptic, 3- or 4-toothed lamina, 2–3-times longer than tube; staminodes sometimes present. **Disc florets** bisexual, fertile or inner sterile; corolla concolorous with ray florets, tubular, widened above, deeply 5-lobed. **Anthers** with bases sagittate, shortly mucronate-acuminate **Style** terete, thickened above, with ± linear-lanceolate branches; styles of inner, sterile florets usually undivided. **Cypselas** obovoid-obconical, with rows of swollen cells, sericeous. **Pappus** of many, delicate, slender scales, sometimes difficult to distinguish from cypsela hairs. x = 5, 6, 7 (polyploidy).

Species 17, Africa; mainly in Namibia and South Africa with *Gazania krebsiana* Less. subsp. *serrulata* (DC.) Roessler extending to Angola and Tanzania, and *G. rigens* (L.) Gaertn. var. *uniflora* (L.f.) Roessler also occurring in Mozambique.

Geigeria Griess. 9090000

(Inuleae)

Griesselich: 411 (1830); Bentham: 337 (1873a); Oliver & Hiern: 367 (1877); Harvey: 124 (1865); Phillips: 810 (1951); Merxmüller: 251 (1953); Merxmüller: 74 (1967a); Hilliard: 283 (1977); Wild: 53 (1982); Anderberg: 286 (1994).

Diplostemma Hochst. & Steud. ex DC.: 75 (1838b). *Araschcoolia* Sch.Bip. ex Benth.: 337 (1873a). *Thysanurus* O.Hoffm.: 127 (1889b).

Perennial herbs, rosulate-acaulescent or variously branched, subshrubs or small shrubs. **Stems** erect or prostrate, glabrous or variously hairy, often glandular-punctate, winged or not. **Leaves** alternate, sessile, generally linear to lanceolate, entire or denticulate, usually glandular-punctate. **Capitula** radiate, few- to several-flowered, sessile, solitary or few, in terminal or axillary clusters. **Involucre** ovoid or globose; bracts in many rows, outer bracts usually with foliaceous appendages. **Receptacle** convex to conical, epaleate but with many bristles. **Ray florets** female, marginal; corolla yellow, tube 3- or 4-toothed or -lobed, oblong or linear-oblong; lamina longer than tube; ovary oblong; style terete, with linear,

obtuse branches. **Disc florets** bisexual, fertile; corolla tube slightly narrowed upwards, with linear-lanceolate lobes ± half as long as tube. **Anther** bases sagittate; with lanceolate, apical appendage. **Style** terete, slightly swollen at base; branches linear, acute. **Cypselas** ellipsoid or turbinate, villous. **Pappus** usually of 10 broad scales with alternate ones sometimes awned. $x = 10$ (1 report).

Species 27, mostly in the southern part of Africa; 21 in sthn Afr., widespread, absent from the Western Cape.

Gerbera L. 9528000

(Mutisieae)

Linnaeus: 247 (1758) name conserved: Oliver & Hiern: 445 (1877); Phillips: 851 (1951); Wild: 202 (1972); Hilliard: 586 (1977); Hansen: 8 (1985); Bremer: 100 (1994).

Perennial herbs, acaulescent and scapigerous, often with woolly crown. **Leaves** radical, entire, serrulate, dentate or sinuate-pinnatifid, pilose or tomentose or glabrescent. **Capitula** radiate, solitary on long scapes; scapes 1-headed, many-flowered, bracteate or ebracteate. **Involucre** turbinate to broadly campanulate; bracts in many rows, outer shorter than inner, obtuse. **Receptacle** flat, epaleate. **Ray florets** in 1 or 2 rows, usually female; corolla white, yellow, pink or red, bilabiate, outer lip strap-shaped or shortly elliptic, (2)3-denticulate, inner lip of 2 small, linear lobes. **Disc florets** bisexual, fertile or inner functionally male, of same colour as ray florets, also bilabiate; outer lip ± elliptic, 3-toothed or occasionally 3-lobed; inner lip of (1)2 or 3 linear or oblong lobes, usually reflexed. **Anthers** with bases sagittate, tailed, tails entire or ciliate; apical appendage lanceolate. **Style** terete, with shortly and broadly lanceolate branches, tips rounded or subacute with short, pollen-sweeping hairs outside. **Cypselas** narrowly flask-shaped, attenuated at apex or sometimes prolonged into beak, ribbed, sparsely puberulous. **Pappus** of many scabrid bristles. $x = 12, 23, 25$ (polyploidy).

Species ± 30, tropical and sthn Afr., Madagascar, Asia; 13 in sthn Afr., widespread but absent from Namibia and Botswana.

Gibbaria Cass. 9427010

(Calenduleae)

Cassini: 139 (1817c); Norlindh: 358 (1943); Nordenstam: 375 (1994).

Under *Osteospermum* by Harvey: 433 (1865).

Shrubs or shrublets. **Leaves** alternate, sessile, scabrid, linear to lanceolate and elliptic, entire or remotely toothed. **Capitula** radiate, shortly pedunculate, terminal, solitary, several- to many-flowered. **Involucre** campanulate; bracts in 2 or 3 rows, free, lanceolate, setose or pilose. **Receptacle** flat or convex, epaleate. **Ray florets** female, fertile; corolla yellow or orange on both sides or white above; tube oblique on ovary, funnel-shaped, with somewhat oblong-elliptic lamina 4–8 × its length. **Staminodes** sometimes present. **Style** terete with linear, obtuse branches. **Cypselas** glabrous, kidney-shaped, convex and transversely rugose on convex side, keeled on reverse side, with ventral cavity. **Pappus** 0. **Disc florets** functionally male; corolla tube widened above, with 5 ovate lobes. **Anthers** ecalcarate, caudate; with ovate, apical appendage; endothecial tissue polarised. **Style** linear, convex, faintly 2-lobed at apex, with apical ring of hairs. **Pappus** 0. $x = 10$ (1 report).

Species 2, endemic to sthn Afr.: *Gibbaria ilicifolia* (L.) Norl. and *G. scabra* (Thunb.) Norl., Western and Eastern Cape.

Gnaphalium L. 8992000

(Gnaphalieae)

Linnaeus: 850 (1753); Harvey: 260 (1865); Hilliard: 267 (1981a); Hilliard: 17 (1983); Anderberg: 167 (1991a); Anderberg: 358 (1994).

Amphidoxa DC.: 246 (1838a). *Demidium* DC.: 246 (1838a)

Annual or perennial herbs, rarely frutescent, whitish woolly. **Leaves** alternate, usually sessile, sometimes amplexicaul, tomentose (hair type B), eglandular; margin flat, entire. **Capitula** disciform, few together, rarely solitary, terminal or racemosely arranged, sometimes surrounded by whorl of leaves. **Involucral** bracts in few rows, light brown, buff, creamy or white; stereome undivided. **Receptacle** flat, nearly smooth or honeycombed, epaleate. **Marginal florets** female, filiform, purple, outnumbering disc florets. **Disc florets** bisexual; corolla purple, narrowly tubular, lobes erect, all with hairs on back. **Anthers** ecalcarate, caudate with short tails; apical appendage flat, as wide as thecae; endothecial tissue polarised. **Style** bifid; style branches truncate and penicillate with obtuse sweeping hairs apically; stigmatic surface separated. **Cypselas** small, oblong, glabrous or sparsely hairy with short, clavate, not myxogenic, twin hairs; epidermis with imbricate papillae. **Pappus** dimorphic, of free, scabrid, capillary bristles in 1 row, basally with patent cilia; apical cells subclavate in disc florets, acute in female florets. $x = 7$ (8, 9, 10, 13) (aneuploids, high polyploidy, B-chromosomes).

Species ± 80, cosmopolitan; 14 in sthn Afr., widespread but absent from Swaziland.

Gorteria L. 9433000

(Arctoteae)

Linnaeus: 1229 (1759); Harvey: 469 (1865); Phillips: 844 (1951); Roessler: 319 (1959); Bremer: 262 (1994).

Annual herbs, sometimes with wiry branches from base. **Leaves** alternate, sometimes radical, sessile, linear to lanceolate, entire or lobed, woolly on lower surface. **Capitula** radiate, several-flowered, solitary, terminal or axillary, subsessile. **Involucre** ovoid; bracts connate into cup towards base, pungent, ciliate, enclosing fruit after anthesis. **Receptacle** basin-shaped, nude, honeycombed, with margins of pits produced. **Ray florets** neuter, arising on side of receptacle; corolla yellow or orange, sometimes with dark basal spot and dark dorsal stripe, with tube absent; lamina ± elliptic above and narrowed into a long claw, 2- or 3-toothed. **Disc florets** bisexual, fertile or central ones sterile; corolla yellow or orange; tube slightly widened above, with 5 linear or lanceolate lobes. **Anthers** shortly sagittate at base; with ovate, apical appendage. **Style** linear, subglobose at base with lanceolate or linear-lanceolate branches; those of innermost florets undivided. **Cypselas** obovoid, apically sericeous. **Pappus** of few narrow setae or ring of minute, hyaline scales or long-ciliate cup, or crown. **Seeds** germinating within capitula.

Species 3, endemic to sthn Afr., occurring S Namibia, Northern Cape (Richtersveld, Namaqualand) and ± along the west and southern coastal region of the Western Cape to Humansdorp in the Eastern Cape.

Grangea Adans. 8865000

(Astereae)

Adanson: 121 (1763); Oliver & Hiern: 304 (1877); Merxmüller: 87 (1967a); Hilliard: 57 (1977); Fayed: 450 (1979); Bremer: 400 (1994).

Annual or perennial, erect or decumbent herbs, ± hairy, branching from base. **Leaves** alternate, sessile, with subauriculate bases, pinnatifid, oblong-obovate to obovate to spathulate in outline, hairy on both sides, lobes

entire or dentate. **Capitula** disciform, ± globose, single in leaf axils or 2–6 terminal, subcorymbosely arranged, on leafless or bracteate peduncles. **Involucre** campanulate or cup-shaped; bracts in ± 3 rows, subequal, with membranous, transparent ciliate margins. **Receptacle** convex to conical, epaleate. **Marginal florets** female, fertile, in 2 or 3, rarely many rows; corolla yellow, tubular, 2–4-dentate, laxly glandular. **Disc florets** many, bisexual, fertile, as long as or longer than outer florets; corolla yellow, lower part tubular becoming campanulate upwards, with 4 or 5 triangular lobes, laxly glandular. **Anthers** ecalcarate and ecaudate, apex with triangular obtuse appendages. **Style** slightly longer than corolla, with 2 short branches; appendages triangular papillose. **Cypselas** small, obovate or elliptic, slightly compressed, with 2 (rarely 4) marginal nerves, upper part often narrowed, loosely hairy. **Pappus** of few, basally connate, scaly bristles, or a corona or rarely 0. $x = 9$ (8).

Species 10, Africa, Madagascar and Asia; 2 in sthn Afr.: *Grangea anthemoides* O.Hoffm., *G. maderaspatana* (L.) Poir., subtropical flats of Namibia and N KwaZulu-Natal.

*Guizotia Cass. 9222000

(Heliantheae)

Cassini: 237 (1829a); Oliver & Hiern: 384 (1877); Wild: 11 (1967); Hansen: 139 (1976); Baagøe: 1 (1974); Karis & Ryding: 610 (1994).

Annual herbs. **Leaves** simple, lower opposite, uppermost alternate, sessile. **Capitula** radiate, solitary and terminal on branches or in cymes. **Involucre** with bracts in 2 rows; bracts dimorphic; outer bracts unequal, large, foliaceous, ciliate; inner bracts smaller. **Receptacle** with ± cucullate paleae. **Ray florets** in 1 row, female; corolla golden yellow, minutely 3-lobed. **Disc florets** bisexual, fertile; corolla yellow, cylindric, narrowed below, with reflexed pubescence at base, 5-lobed. **Anthers** obtuse or minutely sagittate at base; with apical appendage. **Cypselas** obovate, oblanceolate or obconical; ray cypselas triquetrous; disc cypselas 4-angled. **Pappus** 0. $x = 5$ (7, 8—1 report each) (aneuploids, high polyploidy, B-chromosomes).

Species ± 6, tropical Africa; **Guizotia abyssinica* (L.f.) Cass. occurs sporadically in Gauteng and Mpumalanga.

Gymnodiscus Less. 9418000

(Senecioneae)

Lessing: 95 (1831); Harvey: 345 (1865); Bremer: 502 (1994).

Annual herbs, delicate, glabrous. **Leaves** radical, rosulate, sessile, obovate to linear, entire or bluntly lobed, succulent; cauline leaves few, often amplexicaul. **Capitula** radiate, few-flowered, corymbosely arranged on long, almost leafless scapes. **Involucre** ecalyculate, campanulate; bracts in 1 row, free or connate at base, obovate to lanceolate. **Receptacle** convex, epaleate. **Ray florets** female; corolla yellow; tube with linear or elliptic lamina 2.5 × its length. **Disc florets** functionally male; corolla yellow; tube funnel-shaped or campanulate from cylindric base, with 5 lanceolate lobes. **Anthers** oblong, ecalcarate and ecaudate; with oblong, apical appendage; endothecial tissue radial. **Style** linear, with linear, obtuse branches, truncate, with conical appendage, or undivided. **Cypselas** obovoid, smooth, glabrous. **Pappus** 0 in disc florets; of many fine, scabrid bristles, persistent or caducous in marginal florets. $x = 9$.

Species 2, endemic to sthn Afr.: *Gymnodiscus capillaris* (L.f.) DC. and *G. linearifolia* DC., Namaqualand (Northern Cape) and Western Cape.

Gymnopentzia Benth. 9364000

(Anthemideae)

Bentham: 537 (1873a); Hilliard & Burtt: 9 (1971); Hilliard: 362 (1977); Källersjö: 538 (1985); Bremer & Humphries: 95 (1993); Bremer: 448 (1994).

Shrubs, erect or decumbent. **Leaves** opposite, connate and sheathing at base, linear, bifurcate or undivided, glabrous or pilose. **Capitula** discoid, small, in dense terminal corymbs, several- to many-flowered. **Involucre** broadly campanulate; bracts in few rows, ciliate. **Receptacle** flat or slightly convex, epaleate or with occasional paleae. **Disc florets** bisexual, fertile; corolla yellow, tubular below, campanulate above, glandular, with 5 ovate lobes. **Anthers** ecalcarate and ecaudate; with oblong, apical appendage; endothecial tissue polarised. **Style** branches oblong, truncate, penicillate. **Cypselas** ± cylindric, 10-ribbed, long-papillose. **Pappus** 0.

Monotypic, endemic to sthn Afr.: *Gymnopentzia bifurcata* Benth., mountains of Mpumalanga, Free State, KwaZulu-Natal, Lesotho and Eastern Cape.

Gymnostephium Less. 8882000

(Astereae)

Lessing: 185 (1832); Harvey: 66 (1865); Bremer: 422 (1994); Nesom: 85 (1994).

Subshrubs or lignescent herbs, branched, with vestiture of stout, thick-based, usually spreading hairs. **Leaves** alternate, sessile, linear, entire, usually ciliate, sometimes glandular-hairy. **Capitula** radiate, many-flowered, usually solitary, on long peduncles, rarely corymbose. **Involucre** campanulate; bracts in 3 or 4 rows, linear, oblong or elliptic, 1-nerved, with broad scarious margins, usually ciliate, glabrous or scurfy on back. **Receptacle** somewhat concave, honeycombed, epaleate. **Ray florets** female; corolla white or blue, tube cylindric, with linear or oblong-linear, 2- or 3-fid lamina. **Style** terete, with flattened, lanceolate or linear branches. **Disc florets** functionally male, sterile; corolla yellow; tube cylindric, campanulate or widening gradually above. **Anthers** linear, ecalcarate and ecaudate; with ovate, membranous, apical appendage. **Cypselas** oblong-obovate, 2-nerved, strongly compressed, surface black at maturity and minutely 'pebbled', moderately to densely invested with short, white papillae, glabrous to glabrate. **Pappus** of ray florets 0 or of 1 or 2 barbellate or plumose caducous bristles in a single row; of disc florets of 2 or 3 barbellate or plumose caducous bristles.

Species 8, endemic to sthn Afr., Western Cape.

Haplocarpha Less. 9432030

(Arctoteae)

Lessing: 90 (1831); Oliver & Hiern: 427 (1877); Beauverd: 50 (1915); Lewin: 50 (1922); Phillips: 843 (1951); Hilliard: 537 (1977); Pope: 232 (1992); Bremer: 260 (1994).

Perennial, mat-forming, acaulescent herbs, woolly, with stout rootstocks. **Leaves** radical, sessile or narrowed into petiole, entire, toothed or pinnatifid, lower surface whitish-woolly. **Capitula** radiate, many-flowered, solitary, terminal, peduncled. **Involucre** campanulate; bracts in few to many rows, scarious-hyaline on margins. **Receptacle** flat or convex, epaleate. **Ray florets** female, fertile; corolla yellow, strap-shaped; tube pilose at base, with ± linear-oblong, 3-toothed lamina, 3–5 times longer than tube; staminodes sometimes present. **Disc florets** many, bisexual; corolla yellow, infundibuliform, deeply 5-lobed. **Anthers** sagittate at base. **Style** abruptly thickened below branches; branches connate or minutely

bifid. **Cypselas** turbinate, ribbed, glabrous, minutely pubescent or silky-villous, with basal coma of long or short hairs. **Pappus** in 2 to several rows occasionally reduced or 0; inner pappus of delicate, hyaline, lanceolate scales equalling corolla tube in length; outer pappus smaller. $x = 5, 6, 9$ (polyploidy).

Species 10, Africa; 5 in sthn Afr., widespread, absent from Namibia and Botswana.

*Hedypnois Mill. 9569000

(Lactuceae)
Miller: [606] (1754); Sell: 307 (1976); Bremer: 197 (1994).

Annual herbs with milky latex. **Leaves** rosulate, entire to pinnatifid. **Capitula** ligulate, on stout, rather long peduncles. **Involucre** with bracts in 2 distinct, unequal rows. **Florets** bisexual, fertile; corolla yellow, dorsally sometimes with reddish or greenish stripes. **Style** with branches long, sweeping hairs short. **Cypselas** narrowly terete and incurved, enclosed by persistent involucral bracts. **Pappus** dimorphic: in outer florets a small corona; in inner florets of few, coarse, basally flattened and scale-like, scabrid bristles. $x = 3, 4, 5, 6, 7, 8, 9, 11, 13$ (aneuploids, polyploidy, B-chromosomes).

Species 3, Macronesia to the Mediterranean; **Hedypnois cretica* (L.) Dum.Cours., an introduced species, occurs sporadically in the Western and Eastern Cape.

*Helianthus L. 9200000

(Heliantheae)
Linnaeus: 904 (1753); Linnaeus: 386 (1754); Wild: 57 (1967); Hilliard: 309 (1977); Karis & Ryding: 602 (1994).

Perennial or coarse annual herbs. **Leaves** with lower ones opposite, upper ones alternate, ovate to triangular, entire or toothed. **Capitula** radiate, or rarely discoid, usually medium to large, solitary, long-pedunculate. **Involucre** hemispherical; bracts in 2 to many rows, often herbaceous. **Receptacle** flat or convex, paleate; paleae enfolding disc florets. **Ray florets** neuter; corolla yellow, occasionally reddish, strap-shaped, conspicuous. **Disc florets** bisexual, fertile; corolla yellow or sometimes partly or wholly purple, narrowly tubular below, expanded above, 5-toothed. **Anthers** entire or minutely sagittate at base; with apical appendage. **Style** with branches narrowly oblong, tips acutely deltoid with long or short sweeping hairs on outer face. **Cypselas** obovate, ± compressed, often apically emarginate. **Pappus** of 2 deciduous awn-like scales. $x = 17$ (5, 7, 8, 9) (aneuploids, polyploidy).

Species 50, North America; 3 as occasional escapes in sthn Afr., recorded from Gauteng, Free State, KwaZulu-Natal and the Eastern Cape.

Helichrysopsis Kirp. 8992030

(Gnaphalieae)
Kirpicznikov: 32 (1950); Hilliard & Burtt: 207 (1981); Hilliard: 47 (1983); Anderberg: 153 (1991a); Anderberg: 358 (1994).

Perennial herbs, stems much branched, spreading, ashy grey, closely leafy. **Leaves** alternate, sessile, linear, margins entire, strongly revolute, white-cottony (hair type B), contrasting strongly with silky grey upper leaf surface and midrib below, giving striped effect to leaves. **Capitula** disciform, narrowly campanulate, few clustered at branchlet tips. **Involucral bracts** in ± 4 rows, outer short, pellucid, palest brown; inner with tips opaque milk-white, exceeding flowers; stereome undivided. **Receptacle** honeycombed, flat, epaleate. **Flowers** yellow, ± 45–65, 30–50 female, corolla filiform; 12 or 13 bisexual, corolla cylindric, all lobes glandular-hairy on backs. **Anthers** ecalcarate, caudate, tails exceeding filament collar; with small obtuse apical appendage; endothecial tissue polarised. **Style** branches truncate and penicillate with obtuse sweeping hairs apically. **Cypselas** oblong, small, with minute 2-celled globular hairs without swelling cushion, myxogenic. **Pappus** bristles many, tips plumose, shaft nude, 2 or 3 bristles fused together near base and then, a little lower, these compound bristles fused into smooth ring.

Monotypic: *Helichrysopsis septentrionale* (Vatke) Hilliard, KwaZulu-Natal; also coastal Mozambique.

Helichrysum Mill. 9006000

(Gnaphalieae)
Miller: [462] (1754); Persoon: 414 (1807) name conserved; Hilliard: 61 (1983), Anderberg: 141 (1991a), Anderberg: 358 (1994).

Achyrocline (Less.) DC., Hilliard & Burtt: 201 (1981); Hilliard: 59 (1983); Mesfin Tadesse & Reilly: 379 (1995). *Leontonyx* Cass.: 466 (1822).

Annual or perennial herbs or shrublets, generally erect, sometimes prostrate, usually woolly or cobwebby, often glandular, rarely glabrous. **Leaves** alternate, straight, variously shaped, sessile or petiolate, often hairy, pilose to velutinous, margins entire, flat or sometimes revolute. **Capitula** disciform or discoid; cylindric, turbinate, campanulate, subglobose or depressed-globose, in terminal, loose, flat-topped corymbs or solitary. **Involucral bracts** in few to many rows; stereome usually fenestrated (divided); white, yellow, straw-coloured, brown, pink, purple, or red, sometimes a combination of colours; glabrous or hairy. **Receptacle** smooth, honeycombed or fimbrilliferous, flat, epaleate, rarely paleate. **Marginal florets** female, fewer or sometimes more than central florets; corolla often narrowly tubular, sometimes with well-developed lamina, rarely filiform, yellow. **Central florets** bisexual; corolla funnel-shaped or tubular and then ± campanulate above, lobes 5, hairs always present on backs of lobes, yellow. **Anthers** ecalcarate, caudate; with lanceolate apical appendages; endothecial tissue polarised. **Style** branches truncate, penicillate; stigmatic areas separated. **Cypselas** sparsely hairy with short, clavate, myxogenic hairs or with long nonmyxogenic hairs or glabrous; epidermis smooth or often papillose. **Pappus** of barbellate or subplumose bristles, generally in 1 row; bristles basally with or without patent cilia, apical cells clavate or not. $x = 7$ (4, 5, 6, 8, 13) (aneuploids, high polyploidy).

Species ± 600, largely Africa and Madagascar, also Europe, Asia and Australia; 244 in sthn Afr., widely distributed.

Hertia Less. 9377000

(Senecioneae)
Lessing: 94 (1831); Kuntze: 344 (1891); Phillips: 831 (1951); Merxmüller: 99 (1967a); Bremer: 503 (1994); Herman: 192 (1998b).

Doria Less., Harvey: 320 (1865).

Shrublets or shrubs. **Leaves** alternate, entire to serrate, sometimes decurrent, fleshy, glabrous. **Capitula** radiate or disciform, several-flowered, paniculate-corymbose or solitary, pedunculate to sessile. **Involucre** ecalyculate, campanulate to tubular; bracts in 1 row, usually connate below. **Receptacle** flat, epaleate. **Marginal** and **ray florets** female, fertile; corolla yellow, shorter than ovary, faintly toothed or with short lamina or with linear-oblong, 3-toothed lamina ± as long as tube. **Disc florets** functionally male; corolla yellow, tubular, widened above, ribbed, glabrous, with 5 ovate lobes. **Anthers** ecalcarate and ecaudate or faintly sagittate at base; with ovate, apical appendage; endothecial tissue radial. **Style**

terete, divided, with oblong-linear, obtuse or truncate branches. **Cypselas** ellipsoid-oblong, mostly densely pubescent. **Pappus** of many delicate bristles. $x = 10$.

Species ± 10, Africa and Southwest Asia; 5 in sthn Afr., widespread but absent from Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland and KwaZulu-Natal.

Heterolepis Cass. 9057000

(Arctoteae)

Cassini: 26 (1820b); Harvey: 469 (1865); Druce: 628 (1917); Bremer: 257 (1994).

Minurothamnus DC.: 286 (1838b); Harvey: 124 (1865); Merxmüller: 39 (1950).

Shrublets; young branches cobwebby. **Leaves** alternate, linear to linear-oblong, margins entire or remotely dentate, usually revolute, mucronate, usually tomentose on lower surface. **Capitula** radiate, relatively large, solitary, terminal, on long or short, glandular peduncles. **Involucre** broadly campanulate; bracts in 1–3 rows; outermost sometimes herbaceous, papillose; inner oblong to linear, ciliate towards apex, with membranous margins. **Receptacle** epaleate, honeycombed (areolate). **Ray florets** female, fertile; corolla yellow; tube shorter than minutely 3-toothed, oblong-linear lamina, generally with staminodes, with filiform lobe ventrally in sinus of tube. **Disc florets** bisexual, fertile; corolla yellow; tube widening above, with 5 linear lobes. **Anthers** calcarate and caudate; with oblong, apical appendage; endothecial tissue polarised. **Style** slender with rather short style branches, apical portion not or only slightly thickened and with short hairs mainly at border to shaft. **Cypselas** oblong-obovoid, densely sericeous. **Pappus** of stout, subulate, bristle-like marginally barbellate scales in 2 rows. $x = 10$.

Species 3, endemic to sthn Afr., Western Cape.

Heteromma Benth. 8931000

(Astereae)

Bentham: 286 (1873a); Hilliard & Burtt: 364 (1973); Hilliard: 100 (1977); Bremer: 422 (1994).

Chrysocoma subgenus *Heteropsis* Harv.: 95 (1865). *Pentheriella* O.Hoffm. & Muschl.: 316 (1910).

Perennial herbs up to 1 m tall. **Leaves** alternate, sometimes radical, simple, broadly linear or pinnatisect, sessile or petiolate, decurrent. **Capitula** discoid, in panicled corymbs, several-flowered. **Involucre** campanulate; bracts in 2 or 3 rows, inner ones obovate to broadly elliptic, usually membranous. **Receptacle** flat, honeycombed, epaleate. **Florets** bisexual; corolla yellow; tube narrowly cylindric below, becoming campanulate above, 5-lobed. **Anthers** ecalcarate and ecaudate; with lanceolate, apical appendage. **Style** branches oblong, truncate and penicillate with deltoid appendage, with conspicuous sweeping hairs. **Cypselas** elliptic to obovate in outline, somewhat oblique, slightly compressed, usually 3-ribbed, pubescent. **Pappus** in 2 rows, of many fine scabrid bristles, caducous.

Species 3, endemic to sthn Afr., Free State, KwaZulu-Natal, Lesotho and Eastern Cape.

Heterorhachis Sch.Bip. ex Walp. 9438020

(Arctoteae)

Walpers: 278 (1846–1847); Harvey: 505 (1865) as *Berkheya palmata* (Thunb.) Willd.; Roessler: 312 (1959); Bremer: 262 (1994).

Shrubs or shrublets, rigid, coarse, woolly or flocculent. **Leaves** alternate, dense, pinnatifid, cobwebby beneath, becoming glabrous and glossy above, lobes pungent, with revolute margins. **Capitula** radiate, in terminal racemose clusters. **Involucre** with bracts basally somewhat connate, in 3 rows, with basal ones spine-toothed, middle ones longest, entire, lanceolate-acuminate. **Receptacle** conspicuously honeycombed; outer cavities thick-walled, inner walls membranous. **Ray florets** sterile, usually with rudimentary stamens; corolla yellow, lamina 3- or 4-dentate, minutely glandular-pubescent. **Disc florets** bisexual, fertile; corolla yellow, minutely glandular-pubescent. **Cypselas** obconical, thinly and very shortly pubescent or nearly glabrous. **Pappus** of scales ± in 2 rows, lanceolate, plumose-fimbriate, outer ones the shorter.

Monotypic: *Heterorhachis aculeata* (Burm.f.) Roessler is endemic to the Northern and Western Cape.

Hilliardia B.Nord. 9339020

(Anthemideae)

Nordenstam: 147 (1987); Bremer & Humphries: 157 (1993); Bremer: 474 (1994).

Scrambling shrubs. **Leaves** alternate, flat, herbaceous, pinnatilobate. **Capitula** radiate, pedunculate, solitary or laxly corymbose. **Involucral bracts** 8–11, imbricate, rounded-oblong, with subscarious hyaline margins and obtuse-rounded hyaline tip. **Receptacle** hemispherical or conical, glabrous, epaleate. **Ray florets** 8–13, female, fertile, strap-shaped; lamina oblanceolate-elliptic-obovate, white, with several branching veins, minutely papillate on upper surface, apically bifid, with short tube split adaxially to base. **Disc florets** many, bisexual; corolla tubular, 4-lobed. **Anthers** ecalcarate and ecaudate; apically with flat obtuse-truncate appendage. **Style** branches apically truncate, inside with discrete stigmatic areas. **Cypselas** elliptic-oblong, glabrous, adaxially slightly flattened and 3-ribbed, wall very thin, translucent and showing brownish black, rounded and very thick-walled testa epidermis cells. **Pappus** 0. $x = 10$ (1 report).

Monotypic, endemic to sthn Afr.: *Hilliardia zuurbergensis* (Oliv.) B.Nord., KwaZulu-Natal and Eastern Cape.

Hippia L. 9357000

(Anthemideae)

Linnaeus: 158 (1771); Harvey: 170 (1865); Hutchinson: 178 (1918); Bremer & Humphries: 160 (1993); Bremer: 474 (1994).

Shrublets or subshrubs, aromatic. **Leaves** alternate, pinnatisect, lobed, dentate or rarely entire. **Capitula** disciform, several-flowered, small, corymbose, occasionally solitary. **Receptacle** convex or conical, epaleate. **Involucre** campanulate; bracts in 3 or 4 rows, often glandular, sometimes ciliate and pilose on back. **Marginal florets** female, fertile, corolla tube short or conical, minutely 2–4-lobed; without lamina. **Disc florets** functionally male; corolla tube cylindric or funnel-shaped below and campanulate above, sometimes narrowly winged, glandular, with 5 ovate lobes; sometimes irregular. **Anthers** linear-oblong, ecalcarate and ecaudate; with oblong or linear-oblong, apical appendage. **Style** linear or terete, sometimes swollen at base, undivided, disciform and glandular at base. **Cypselas** dorsiventrally flattened, generally laterally winged. **Pappus** 0.

Species 8; endemic to sthn Afr., Western and Eastern Cape.

Hirpicium Cass. 9435000

(Arctoteae)

Cassini: 27 (1820b); Harvey: 485 (1865); Phillips: 845 (1951); Roessler: 333 (1959); Roessler: 86 (1975); Bremer: 262 (1994).

Berkheyopsis O.Hoffm.: 311 (1892).

Annual or perennial herbs, subshrubs or shrubs. **Leaves** alternate, sometimes fascicled, ericoid or lanceolate,

sometimes scabrid and pungent and whitish-woolly beneath. **Capitula** radiate, many-flowered, solitary, terminal, pedunculate or subsessile. **Involucre** campanulate; bracts connate into cup-like base, sometimes setose, with lobes sometimes partially reflexed. **Receptacle** conical, honeycombed. **Ray florets** neuter; corolla yellow, strap-shaped; tube flattened with lamina linear, 3-toothed; staminodes sometimes present. **Disc florets** bisexual, fertile; corolla yellow, tubular, slightly widened above, with 5 linear lobes, setose on back. **Anthers** minutely sagittate. **Style** terete, thickened above, with linear branches. **Cypselas** obconical, ± ribbed, pilose. **Pappus** generally of 2 distinct rows, each of 10 broad scales, with inner row of short scales and outer row of slender, membranous scales or of scales divided into linear segments ± as long as corolla tube. $x = 5$.

Species 12, southern and tropical Africa; 8 in sthn Afr., widespread.

Hoplophyllum DC. 8749000

(Eremothamneae)

Candolle: 73 (1836a); Harvey: 54 (1865); Phillips: 776 (1951); Bremer: 70 (1994); Karis: 193 (1992).

Spiny shrubs or subshrubs. **Leaves** alternate, linear, pungent. **Capitula** discoid; 4–6-flowered, sessile, solitary or in small clusters, axillary or terminal. **Involucre** narrowly campanulate; bracts in ± 7 rows, with outer smallest, broadly elliptic, spinous-pointed, glabrous. **Receptacle** flat, fimbriate. **Corolla** yellow; tube subcylindric; lobes 5, linear, glandular on back. **Anthers** linear, tailed; with small, ovate, membranous, apical appendage. **Style** branches filiform, setose. **Cypselas** oblong, ribbed, densely villous. **Pappus** of many long, scabrid bristles. $x = 9$.

Species 2, endemic in sthn Afr.: *Hoplophyllum ferox* Sond., known from the Western Cape, and *H. spinosum* DC., occurring in Northern and Western Cape.

Hydroidea P.O.Karis 9043020

(Gnaphalieae)

Karis: 29 (1990); Anderberg: 74 (1991a); Anderberg: 331 (1994).

Compact, dense, much or sparingly branched shrublet with axillary brachyblasts. **Leaves** in fascicles, involute ericoid with a skin-like indumentum beneath, occasionally with a few longer hairs, older leaves glabrous, acute to subacute, mucronate. **Capitula** discoid, solitary, 50–140-flowered. **Involucral bracts** in 8–11 rows, white; stereome undivided. **Receptacle** broadly conical, epaleate. **Florets** perfect. **Corolla** narrowly cylindrical, slightly widened above, glabrous. **Cypselas** with wholly papillose, large narrowly oblong epicarp cells; endocarp of the persistent, enlarged, in transverse section equally long testa epidermis cells with brown inversely U-shaped wall thickenings and narrowly oblong from above. **Pappus** bristles barbellate, shaft apically widened with free clavate cells with very thick light-refractive walls.

Monotypic: *Hydroidea elsiae* (Hilliard) Karis, endemic to Western Cape.

Hymenolepis Cass. 9327000

(Anthemideae)

Cassini: 138 (1817c); Bremer & Källersjö: 517 (1985); Källersjö: 534 (1985); Bremer & Humphries: 95 (1993); Bremer: 448 (1994).

Oligodora DC.: 282 (1838a). *Phaeocephalus* S.Moore: 158 (1900a).

Glabrous or pubescent shrubs; indumentum of stellate hairs. **Leaves** alternate, entire or lobed. **Capitula** discoid, with 6–10 florets, slender, in dense corymbs. **Involucre** narrowly ellipsoid-cylindrical to obconical. **Receptacle** flat, generally with paleae, rarely epaleate. **Corolla** gradually expanded, funnel-shaped above, 5-lobed, with distinct nervation, glandular all over with short-stalked biseriate glands. **Anthers** ecalcarate and ecaudate; endothecial tissue polarised. **Styles** sometimes with secretory cavities. **Cypselas** ellipsoid-obovoid to terete, glabrous, with 5–10 ribs. **Pappus** of basally united, fimbriate scales.

Species 7; endemic to sthn Afr., Western and Eastern Cape.

Hypericophyllum Steetz 9262000

(Helenieae)

Steetz: 498 (1864); Pope: 104 (1975); Karis & Ryding: 539 (1994).

Perennial herbs, pilose. **Leaves** opposite, shortly petiolate or sessile, blade elliptic to broadly elliptic or oblanceolate, entire to undulate margin, glabrous or pubescent. **Capitula** discoid, with many florets, solitary at ends of branches; peduncles long, usually thickened towards apex. **Involucre** broadly turbinate-campanulate; bracts in 3–5 rows; outer row ± broadly ovate, ± striate; inner row longer and narrower. **Receptacle** convex, epaleate. **Florets** bisexual. **Corolla** orange or reddish orange; tube widening gradually from base, deeply 5-lobed at apex. **Anthers** with base obtuse; appendage narrowly ovate, exserted. **Style** glabrous; branches obtuse or truncate, papillate outside. **Cypselas** narrowly obpyramidal to narrowly turbinate, longitudinally ribbed, sometimes 4- or 5-angled, glabrous, hirsute or strigose. **Pappus** of many setae, in 1 row, terete, uncinate or sometimes with few straight setae, usually with narrow membranous, ± fimbriate lateral wings in lower third.

Species 7, tropical Africa; 1 in sthn Afr.: *Hypericophyllum elatum* (O.Hoffm.) N.E.Br., Northern Province.

*__Hypochaeris__ L. 9572000

(Lactuceae)

Linnaeus: 810 (1753); Linnaeus: 352 (1754); Phillips: 852 (1951); Henderson & Anderson: 378 (1966); Hilliard: 599 (1977); Pope: 192 (1992); Bremer: 198 (1994).

Annual or perennial, acaulescent herbs with milky latex; with deep taproot; stems solitary or few, often branched. **Leaves** mostly radical, entire, toothed or pinnatifid. **Capitula** ligulate, solitary or several in sparingly branched, corymbose panicles. **Involucre** oblong-cylindrical or campanulate; bracts in several rows. **Receptacle** paleate; paleae linear, acuminate. **Florets** bisexual; corolla yellow or white, strap-shaped. **Anthers** with base sagittate, auricles mucronate-acuminate. **Style** branches long, obtuse, sweeping hairs short. **Cypselas** spindle-shaped, at least inner ones beaked, tuberculate, ribbed. **Pappus** of plumose bristles, in 1 or 2 rows. $x = 4, 5$ (3, 6, 7, 8, 11) (high polyploidy, B-chromosomes).

Species ± 50, Europe, Asia, North Africa, South America; 4 in sthn Afr., not known from Namibia and Botswana.

Ifloga Cass. 8967000

(Gnaphalieae)

Cassini: 142 (1819c); Hilliard: 296 (1981b); Anderberg: 153 (1991a); Anderberg: 359 (1994).

Comptonanthus B.Nord.: 54 (1964).

Annual herbs with ericoid habit. **Leaves** alternate, sessile, often adaxially concave, tomentose on adaxial surface only (hair type B), eglandular; margin involute, entire. **Capitula** disciform, few together along axis. **Involucral bracts** papery, brownish, transparent, glabrous;

stereome divided. **Receptacle** flat, epaleate. **Marginal florets** female, purple, filiform, pistillate, more than disc florets. **Disc florets** bisexual or rarely functionally male; corolla yellow, tube cylindric, lobes erect. **Anthers** ecalcarate, shortly tailed at base; apical appendage flat, as wide as thecae; endothecial tissue radial. **Style** bifid; style branches truncate with obtuse sweeping hairs apically; stigmatic surfaces separated. **Cypselas** small, oblong, with globose, myxogenic twin hairs; epidermis smooth. **Pappus**: 1 row of free, apically plumose, capillary bristles, basally with patent cilia. $x = 7$.

Species 6, mostly Africa, north to the Middle East, spreading to Canary Islands; 4 in sthn Afr., widespread but absent from Botswana, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Inezia E.Phillips 9337010

(Anthemideae)

Phillips: 297 (1932); Brusse: 27 (1989); Bremer & Humphries: 146 (1993); Bremer: 471 (1994).

Perennial herbs, with erect stems from woody rootstock. **Leaves** alternate, entire or pinnatisect, glandular-punctate, pilose. **Capitula** radiate, many-flowered, solitary, terminal, pedunculate. **Involucre** campanulate; bracts in 3 or 4 rows, ± linear, pilose; inner bracts with membranous tip. **Receptacle** conical, epaleate. **Ray florets** female, fertile or sterile, yellow or white; corolla tube short or 0, ciliate and glandular on margin, with obovate, 2- or 3-toothed lamina, 3 to 4 times longer than tube. **Disc florets** bisexual, fertile, yellow; corolla tube somewhat compressed, winged, glandular on margins, 4-lobed, with 2 lateral lobes somewhat cucullate, dorsal and ventral lobes ovate. **Anthers** ecalcarate and ecaudate, with ovate, apical appendage. **Style** terete, somewhat swollen at base, with oblong, truncate branches; cells of stylopodium thick-walled. **Cypselas** oblong, 4-angled, glandular. **Pappus** of minute scales or 0. $x = 10$.

Species 2, endemic to sthn Afr.: *Inezia integrifolia* (Klatt) E.Phillips and *I. speciosa* Brusse, Northern Province, Mpumalanga and Swaziland.

Inula L. 9061000

(Inuleae)

Linnaeus: 881 (1753); Anderberg: 97 (1991b); Anderberg: 287 (1994).

Annual or perennial herbs. **Leaves** alternate, generally sessile, margins dentate or denticulate, hairy and glandular. **Capitula** radiate, disciform or discoid, few together, pedunculate. **Involucre** campanulate; bracts in several rows, lanceolate, outer ones glandular. **Receptacle** honeycombed, epaleate. **Ray florets** female, usually fertile; corolla yellow, strap-shaped, tube cylindric, sometimes ± as long as 3-toothed lamina, sometimes miniradiate or tubular. **Disc florets** bisexual, fertile; corolla yellow; tube slightly widening upwards; lobes 5, ovate. **Anthers** ecalcarate, caudate, with branched tails; with lanceolate, apical appendage; endothecial tissue radial. **Style** with acute sweeping hairs not reaching furcation. **Cypselas** ellipsoid or ± cylindrical, ribbed. **Pappus** of barbellate bristles in 1 row (rarely several rows). $x = 8$ (5, 6, 9) (aneuploids, high polyploidy, B-chromosomes).

Species ± 100, Europe, Africa, Asia; 2 in sthn Afr.: *Inula glomerata* Oliv. & Hiern and *I. paniculata* (Klatt) Burtt Davy, Northern Province and Mpumalanga.

Inulanthera Källersjö 9326010

(Anthemideae)

Källersjö: 539 (1985); Bremer & Humphries: 108 (1993); Bremer: 455 (1994).

Glabrous or pubescent shrubs; indumentum of simple hairs; secretory cavities completely absent from all parts. **Leaves** alternate, entire, toothed or lobed, dotted with immersed glands. **Capitula** discoid, in corymbs. **Involucre** subglobose. **Receptacle** flat, generally with paleae, rarely epaleate. **Corolla** glandular, with narrow tube and distinct, partly enervate 5-lobed limb. **Anthers** ecalcarate and caudate with distinct tails; endothecial tissue polarised. **Cypselas** obovoid with slightly curved base, and with (8–)10 rounded ribs, sometimes with minute papillae, occasionally with small, almost sessile glands in 2 rows. **Pappus** of small, entire or toothed scales; 1 scale terminating each rib.

Species 10, sthn Afr., Angola, Zimbabwe and Madagascar; 7 in sthn Afr., Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal and Eastern Cape.

Kleinia Mill. 9411050

(Senecioneae)

Miller: [729] (1754); Harvey: 315 (1865); Merxmüller: 104 (1967a); Jeffrey: 923, 935 (1986); Halliday: 22, t. 3878, 42, t. 3882, 70, t. 3888, 128, t. 3900 (1988); Bremer: 504 (1994).

Senecio L. in part, Phillips: 833 (1951). *Notonia* DC.: 518 (1833). *Notoniopsis* B.Nord.: 69 (1978).

Succulent perennial herbs or shrubs. **Leaves** alternate, entire or serrate-lacerate, succulent or reduced and stem then succulent. **Capitula** discoid, few or many, solitary or corymbose. **Involucre** mostly calyculate; bracts in 1 row. **Receptacle** flat, epaleate. **Disc florets** bisexual, yellow, orange or red, tubular, 5-toothed. **Anthers** ecalcarate and ecaudate; endothecial tissue radial. **Style** branches with conical to somewhat elongated, terminal appendages. **Cypselas** oblong, ribbed. **Pappus** of many fine bristles. $x = 10$ (9—1 report) (aneuploids).

Species ± 40, mainly in tropical Africa, also in the Middle East, India, and Sri Lanka; 5 in sthn Afr., widespread.

Lachnospermum Willd. 9045000

(Gnaphalieae)

Willdenow: 1787 (1803); Harvey: 272 (1865); Pillans: 87 (1954); Hilliard & Burtt: 218 (1981); Anderberg: 74 (1991a); Anderberg: 331 (1994).

Carpholoma D.Don: 555 (1826). *Erythropogon* DC.: 254 (1838a). *Tulocliuia* Rafin.: 119 (1838).

Shrublets, slightly greyish-woolly. **Leaves** alternate, ericoid, somewhat twisted, in fascicles, involute, adaxially tomentose. **Capitula** discoid, 16–45-flowered with florets bisexual and fertile, solitary at apices of branches or 2 or 3 together and corymbose. **Involucre** ellipsoid to campanulate, bracts in ± 10 rows, lanceolate, tips acute or obtuse, usually reddish, woolly on backs; stereome undivided. **Receptacle** flat, epaleate or with a few scattered paleae between outer florets; paleae ± as long as corolla, sometimes sparsely ciliate. **Ray florets** 0. **Disc florets** sometimes widened above, with 5 oblong lobes, lobes hairy on outer side. **Anthers** tailed, with a lanceolate, apical appendage. **Style** terete, somewhat swollen at base, sometimes seated on annular disc, with linear, truncate branches. **Cypselas** ± terete, 4- or 5-angled, hairy on ribs, hairs long and unicellular, sometimes also multicellular, gland-tipped hairs; annulus well-developed. **Pappus** of shortly barbellate bristles as long as corolla and sometimes overtopping.

Species 3, endemic to Western Cape.

*Lactuca L. 9596000

(Lactuceae)

Linnaeus: 795 (1753); Linnaeus: 348 (1754); Oliver & Hiern: 450 (1877); Phillips: 854 (1951); Hilliard: 629 (1977); Pope: 196 (1992); Bremer: 184 (1994).

Annual, biennial or perennial, acaulescent or caulescent herbs with milky latex. **Leaves** alternate or radical; cau-

line leaves often auriculate-amplexicaul, entire, coarsely toothed or pinnatifid, glabrous. **Capitula** ligulate, solitary to corymbose or panicled. **Involucres** cylindric; bracts in several rows, elongating in fruiting stage. **Receptacle** flat, epaleate, alveolate. **Florets** ligulate, bisexual, fertile; corolla yellow, whitish purple or blue, strap-shaped, tube cylindric, with tuft of hairs below lamina; lamina shortly 3–5-lobed. **Anthers** linear, sagittate at base, auricles acute or shortly setaceous-acuminate; with lanceolate apical appendage. **Style** linear, sometimes terete above, pubescent on upper portion; branches linear, subobtuse, sweeping hairs long. **Cypselas** flattened, elliptic-oblong to obovate, ribbed, glabrous or scabrid-hispid, generally with distinct slender to filiform beak. **Pappus** of many fine, smooth or scabrid bristles. $x = 9$ (6, 8, 17) (polyploidy, B-chromosomes).

Species ± 100, cosmopolitan, especially in north temperate regions; 5 in sthn Afr., widespread.

Laggera Sch.Bip. ex Benth. 8940000

(Plucheeae)

Bentham: 290 (1873a); Merxmüller: 107 (1967a); Anderberg: 161 (1991c); Anderberg: 300 (1994).

Herbs, aromatic; stem with resin ducts. **Leaves** alternate, dentate, decurrent, hairy. **Capitula** disciform, terminal, few to many together, often in large, loose synflorescence; flowers mauve, pink or yellow. **Receptacle** flat, epaleate. **Involucral bracts** narrow, often squarrose. **Marginal florets** female; corolla filiform, 3-lobed. **Disc florets** bisexual, 4- or 5-lobed. **Anthers** ecaudate, calcarate; endothecial tissue radial. **Style** bifid; style branches with obtuse sweeping hairs reaching below the furcation. **Cypselas** distinct, stout, ellipsoid, without resin ducts, with straight hairs. **Pappus** of free, barbellate, capillary bristles in 1 row; each bristle with adpressed teeth. $x = 5$ (9) (polyploidy, B-chromosomes—1 report).

Species 17; tropical Africa, Arabian Peninsula, Asia; 2 in sthn Afr.: *Laggera crispata* (Vahl) Hepper & Wood and *L. decurrens* (Vahl) Hepper & Wood, widespread but absent from Western Cape.

Lamprocephalus B.Nord. 9411080

(Senecioneae)

Nordenstam: 323 (1975); Bremer: 505 (1994).

Shrublets, glabrous except for loose cobwebby tomentum in leaf axils and on adaxial sides of young leaves. **Leaves** alternate, sessile, simple, linear, base half-clasping, subcarnose or coriaceous, mucronate. **Capitula** discoid, terminal, solitary, ± 15–30-flowered; peduncle long. **Involucre** ecalyculate, cupuliform to narrowly campanulate; involucral bracts 11–13, in 1 row, equal, free from base, linear-lanceolate. **Receptacle** flat, epaleate. **Disc florets** bisexual, fertile; corolla tubular, probably red with yellowish base, glabrous; lobes narrowly triangular, thickish, with involute margins and subcucullate tips. **Anthers** ecalcarate and ecaudate or minutely sagittate, with flat, acute, narrowly triangular appendage; endothecial cells with thickenings on longitudinal and transverse walls. **Style** terete, basally swollen; style branches stout with continuous stigmatic areas, apically with oblong-triangular, obtuse-subacute, minutely papillate appendage. **Cypselas** narrowly oblong, obscurely 5-angular, brown, eventually black, covered with small, whitish, mucilaginous, papilliform hairs. **Pappus** bristles copious, in many rows, persistent, laxly and minutely serrulate, glossy white.

Monotypic, endemic to sthn Afr.: *Lamprocephalus montanus* B.Nord., Western Cape.

Langebergia Anderb. 8995010

(Gnaphalieae)

Anderberg: 93 (1991a); Nordenstam: 406 (1996).

Petalacte D.Don section *Amphilasia* DC.; Harvey: 288 (1865).

Shrubs. **Leaves** alternate, sessile, greyish tomentose (hair type B), eglandular, margin flat, entire. **Capitula** disciform, in terminal flat-topped corymbs. **Involucral bracts** papery, white, opaque; stereome undivided. **Receptacle** flat, epaleate. **Female florets** purple, pistillate, filiform, fewer than disc florets. **Disc florets** bisexual or functionally male; corolla purple, lobes erect. **Anthers** ecalcarate, caudate with short tails; apical appendage flat, as wide as thecae; endothecial tissue polarised. **Style** bifid; style branches truncate with obtuse sweeping hairs apically; stigmatic surfaces separated. **Cypselas** ellipsoid, with short, clavate, nonmyxogenic twin hairs; epidermis smooth. **Pappus** of free, barbellate, capillary bristles in 1 row, basally with patent cilia; apical cells clavate, white, opaque.

Monotypic, endemic to sthn Afr.: *Langebergia canescens* (DC.) Anderb., Western Cape.

Lasiopogon Cass. 8987000

(Gnaphalieae)

Cassini: 75 (1818); Harvey: 264 (1865); Nordenstam: 60 (1964); Hilliard: 5 (1983); Anderberg: 155 (1991a); Anderberg: 359 (1994).

Annual herbs, small, prostrate and woolly. **Leaves** alternate, sessile, small, oblong to spathulate, obtuse, base narrowed, margins flat, entire, loosely enveloped in wool (hair type B), eglandular. **Capitula** disciform, campanulate, closely surrounded by leaves, massed in glomerules at branchlet tips; flowers whitish, often tipped reddish. **Involucral bracts** in 2 or 3 rows; apex obtuse to truncate, often emarginate, whitish to straw-coloured; stereome divided. **Receptacle** shortly honeycombed or shallowly tuberculate, epaleate. **Marginal florets** female, narrowly tubular or filiform, fewer than, more than or equalling disc florets. **Disc florets** bisexual; corolla tubular below, campanulate above, with 5 deltoid lobes; all lobes glandular-hairy on backs. **Anthers** caudate, ecalcarate, with small, obtuse apical appendage; endothecial tissue polarised. **Style** bifid; style branches truncate and penicillate, obtuse sweeping hairs scarcely extending down backs of branches. **Cypselas** oblong, usually with minute globular duplex hairs, or ellipsoidal unicellular; all myxogenic. **Pappus** bristles in 1 row, either wholly plumose or with clavate cells at tip and shaft wholly or partly plumose, subplumose, barbellate or nude, when not plumose, base with patent cilia, or bristles expanded in lowest quarter and fused at base. $x = 7$.

Species 8, mainly Africa, 1 also Spain to India; all 8 in sthn Afr., Namibia, Free State, Northern, Western and Eastern Cape.

Lasiospermum Lag. 9321000

(Anthemideae)

Lagasca: 31 (1816); Harvey: 153 (1865); Müller: 124 (1988); Bremer & Humphries: 94 (1993); Bremer: 451 (1994).

Annual or perennial herbs, sometimes decumbent, rooting at nodes. **Leaves** alternate, long pilose to glabrous, pinnatisect to bipinnatisect, rarely entire. **Capitula** radiate or discoid, pedunculate, solitary or paniculate, terminal. **Involucral bracts** in 2–4 rows, narrowly oblong to elliptic to almost quadrate, with membranous margin and apex, long pilose or felted to glabrous. **Receptacle** flat or convex, paleate; paleae membranous. **Ray florets** when present, few, female; corolla white or reddish; tube

sometimes flattened, with short or long lamina. **Disc florets** numerous, corolla sometimes reddish; tube campanulate above, with 5 ovate lobes. **Anthers** ecalcarate and ecaudate; with lanceolate apical appendage; endothecial tissue polarised. **Style** terete, discoid at base, with linear, truncate branches. **Cypselas** oblong-ovate, slightly flattened, smooth, dark yellow-brown, copiously woolly. **Pappus** 0. $x = 9, 10$.

Species 4, Egypt and sthn Afr.; 4 in sthn Afr., Namibia, North-West, Gauteng, Free State, Lesotho, Northern, Western and Eastern Cape.

Launaea Cass. 9593000

(Lactuceae)

Cassini: 321 (1822); Harvey: 527 (1865) under *Microrhynchus*; Oliver & Hiern: 460 (1877); Hilliard: 619 (1977); Pope: 214 (1992); Bremer: 188 (1994).

Annual, biennial or perennial herbs, glabrous, with milky latex. **Stems** erect or prostrate, simple or branched. **Leaves** mostly in rosettes, sinuate, coarsely toothed or pinnatifid. **Capitula** ligulate, few- to several-flowered, pedunculate or occasionally sessile, solitary or in lax, irregular corymbs, or clustered. **Involucres** campanulate or cylindrical; bracts in 2 to several rows, becoming ± swollen and corky towards base, innermost subequal, usually exceeding outer. **Receptacle** epaleate. **Florets** bisexual, fertile; corolla yellow, strap-shaped; tube slender, cylindric; ligule short, 4- or 5-toothed. **Anthers** sagittate at base, auricles acute or shortly setaceous-acuminate; with lanceolate, apical appendage. **Style** linear, terete, and pubescent above, with linear, obtuse or subobtuse branches, sweeping hairs long. **Cypselas** usually ellipsoid-fusiform or terete, often somewhat compressed, ribbed, sometimes apically attenuate or beaked, rugose or verrucose, rough or smooth. **Pappus** of bristles in many rows, or of bristles intermixed with many down-like hairs. $x = 9$ (4, 6, 7, 8, 13) (polyploidy, B-chromosomes).

Species ± 30, Canary Islands, Mediterranean region, East Asia, Africa and Madagascar; 4 in sthn Afr., widespread.

Lepidostephium Oliv. 9340000

(Gnaphalieae)

Oliver: 22, t. 1030 (1868); Kroner: 102 (1980); Anderberg: 49 (1991a); Anderberg: 324 (1994).

Perennial herbs, unbranched. **Leaves** radical and cauline, alternate, sessile, lanceolate to linear, margin revolute, denticulate or entire, glandular-hairy and hairy (hair type B). **Capitula** radiate, many-flowered, pedunculate, solitary or in loose corymbs. **Involucre** campanulate; bracts in 6 rows, lanceolate; stereome undivided. **Receptacle** flat, epaleate. **Ray florets** female, violet; corolla tube sparsely glandular, with linear, 3-toothed lamina 3–4 times as long as tube. **Staminodes** often present. **Disc florets** bisexual, fertile; corolla yellow; tube funnel-shaped, narrowly campanulate above, with 5 ovate, retrofract lobes. **Anthers** ecalcarate, caudate; apical appendage flat; endothecial tissue polarised. **Style** bifid, style branches obtuse, dorsally with obtuse sweeping hairs not reaching furcation; stigmatic surfaces basally separated but apically converging. **Cypselas** sparsely hairy with elongated twin hairs and glandular hairs. **Pappus** of free, barbellate, capillary bristles (sometimes of different length) in several rows or of scales.

Species 2, endemic to sthn Afr.: *Lepidostephium asteroides* (Bolus & Schltr.) Kroner and *L. denticulatum* Oliv., KwaZulu-Natal and Eastern Cape.

*Leucanthemum Mill. 9341080

(Anthemideae)

Miller: [769] (1754); Heywood: 175 (1976); Hilliard: 348 (1977); Bremer & Humphries: 141 (1993); Bremer: 468 (1994).

Perennial herbs with red-tipped roots. **Leaves** alternate, serrate or pinnatifid. **Capitula** radiate, solitary, pedunculate. **Involucre** hemispherical or campanulate. **Receptacle** convex or sometimes conical, epaleate. **Ray florets** female, fertile; lamina white. **Disc florets** bisexual, fertile; corolla yellow, 5-lobed; tube basally swollen and spongy in fruit, especially abaxially. **Anthers** ecalcarate and ecaudate; with ovate apical appendage. **Style** branches narrowly oblong, truncate, penicillate. **Cypselas** ± 10-ribbed with vallecular lacunae and vallecular secretory canals as well as vascular strands between ribs, with myxogenic cells along ribs. **Pappus** a corona or an adaxial auricle, sometimes 0. $x = 9$ (aneuploids, high polyploidy, B-chromosomes).

Species ± 33, throughout Europe, 1 species in North Africa, Morocco, Algeria and Tunisia; 1 naturalised as weed in sthn Afr.: **Leucanthemum vulgare* Lam., Mpumalanga, KwaZulu-Natal and Eastern Cape.

Leucoptera B.Nord. 9341020

(Anthemideae)

Nordenstam: 140 (1976); Bremer & Humphries: 157 (1993); Bremer: 475 (1994).

Erect or decumbent glabrous shrublets. **Leaves** alternate or opposite, filiform-linear or oblanceolate, entire or lobed, terete or flattened, somewhat fleshy. **Capitula** radiate, solitary, terminal, pedunculate. **Involucre** broadly campanulate-hemispherical; involucral bracts imbricate, broad, ovate-oblong-obovate with very obtuse or rounded tips, herbaceous, with membranous margins. **Receptacle** convex, epaleate. **Ray florets** female, fertile, usually ± 8, sometimes up to 13, white, often becoming pink-reddish and revolute; tube somewhat compressed, glandular, lamina with smooth surface, apically 3-toothed or subentire. **Style** branches oblong, truncate or somewhat emarginate. **Disc florets** regular, yellow; tube broadly cylindrical, glandular, limb campanulate, 5-lobed. **Anthers** ecalcarate and ecaudate; apical appendage ± ovate, obtuse; endothecial tissue polarised; filament collar subcylindrical with subequal cells. **Style** branches oblong, truncate; style base partly immersed in broad and distinct nectary. **Cypselas** dorsiventrally strongly compressed, laterally winged, white, adaxial side smooth; abaxial side with longitudinal myxogenic striae apically ending in fringe of fused projections; lateral wings scarious, white, opaque. **Pappus** of 3 adaxial, white, scarious scales. $x = 9$ (1 report).

Species 3, endemic to sthn Afr., Northern Cape (Namaqualand) and Western Cape.

Leysera L. 9052000

(Gnaphalieae)

Linnaeus: 1249 (1763); Harvey: 293 (1865); Bremer: 369 (1978); Anderberg: 67 (1991a); Anderberg: 332 (1994).

Shrublets or somewhat woody annuals, greyish-woolly to almost glabrous. **Leaves** alternate, slender, usually mucronate. **Capitula** radiate, many-flowered, solitary, on long peduncles or sometimes corymbose. **Involucre** campanulate; bracts in 4–7 rows, ± oblong, sometimes with dark margins, usually chartaceous and glandular. **Receptacle** nude or sometimes fimbriate. **Ray florets** female, cylindric, with minutely 3-toothed lamina ± as long as tube; ovary linear, glabrous or pilose. **Style** slender with linear, obtuse branches. **Pappus** of narrow,

membranous paleae. **Disc florets** bisexual, fertile, rarely some sterile, corolla tube glandular, with 5 lanceolate lobes. **Anthers** tailed, with an oblong, apical appendage. **Ovary** linear. **Style** linear, with linear, truncate branches, penicillate at apex. **Pappus** double, of membranous paleae and 4 or 5 plumose bristles ± as long as corolla. $x = 7, 8, 17$ (polyploidy).

Species 3, mainly in sthn Afr., 1 in North Africa, Arabian Peninsula and the Middle East; *Leysera gnaphalodes* (L.) L. and *L. tenella* DC., Namibia, Free State, Northern, Western and Eastern Cape.

Lidbeckia P.J.Bergius 9337000

(Anthemideae)

Bergius: 306, t. 5 (1767); Harvey: 154 (1865); Bremer & Humphries: 146 (1993); Bremer: 471 (1994).

Subshrubs, pilose. **Leaves** alternate, sessile or shortly petiolate, pinnately or digitately lobed, glandular-punctate, pilose or glabrous. **Capitula** radiate, many-flowered, solitary, on short or long, pilose or glabrous peduncles. **Involucre** campanulate; bracts in 3 rows, lanceolate, sometimes ciliate, densely villous or glabrous. **Receptacle** convex, epaleate, pilose. **Ray florets** female, sterile or neuter; corolla white, sometimes pilose; tube compressed, with oblong-linear, 2-toothed lamina 3–4 times longer than tube. **Disc florets** bisexual, fertile; corolla tube somewhat compressed, sometimes pilose, with 4 ovate lobes. **Anthers** ecalcarate and ecaudate; with oblong, apical appendage. **Style** terete, with somewhat thickened base and with linear, truncate branches; stylopodium large and persistent in fruit, with thin-walled cells. **Cypselas** ellipsoid, 3–8-ribbed, glandular. **Pappus** 0.

Species 2, endemic to sthn Afr.: *Lidbeckia pectinata* P.J.Bergius and *L. quinqueloba* (L.f.) Cass., both Western Cape.

Litogyne Harv. 8953010

(Plucheeae)

Harvey: 48 (1865); Anderberg: 168 (1991c); Anderberg: 300 (1994).

Epaltes Cass., in part, as to *E. gariepina*, Merxmüller: 57 (1967a); Hilliard: 119 (1977).

Subshrubs. **Leaves** alternate, entire, dentate or rarely sublyrate, decurrent, hairy. **Capitula** disciform, few together in terminal corymbose clusters or solitary; flowers mauve. **Involucre** ovoid-campanulate or hemispherical; bracts in many rows. **Receptacle** epaleate, dome-shaped and centrally depressed with marginal ridge. **Marginal florets** female, in many rows, situated on vertical outer face of marginal receptacle ridge; corolla filiform, 3-lobed. **Disc florets** functionally male, tubular, widening upwards, 3–5(6)-lobed, situated in central depression of receptacle. **Anthers** calcarate and caudate; cells of filament collar flattened; endothecial tissue radial. **Style** undivided; with obtuse sweeping hairs distally. **Cypselas** distinct, stout, subterete, 5–10-ribbed, hairy with straight hairs; without resin ducts. **Pappus** 0.

Monotypic: *Litogyne gariepina* (DC.) Anderb.; Africa, widespread in sthn Afr., but absent from Western and Eastern Cape.

Lopholaena DC. 9401000

(Senecioneae)

Candolle: 335 (1838a); Harvey: 315 (1865); Phillips & Smith: 221 (1934); Hilliard: 365 (1977); Bremer: 505 (1994).

Perennial herbs, shrublets or shrubs. **Leaves** alternate, sessile or subsessile, linear to suborbicular, entire to serrate, often amplexicaul and decurrent, fleshy. **Capitula** discoid, solitary, clustered or paniculate-corymbose, few- to many-flowered. **Involucre** ecalyculate, narrowly campanulate; bracts few to many, in 1 row, connate, at length free to base, sometimes keeled on back or more rarely with wide crest or wing, glabrous or rarely hairy. **Receptacle** flat, honeycombed, margins of alveolae slightly raised; epaleate. **Florets** bisexual, innermost sometimes functionally male; corolla white, pink or purplish; tube becoming campanulate above, articulate ± in middle of cylindric base, with 5 ± deltoid lobes. **Anthers** ecalcarate and ecaudate; with ovate to ovate-oblong appendage; endothecial tissue radial. **Style** terete; branches linear-obtuse, with long, filiform, papillose appendages. **Cypselas** ellipsoid-oblong, obscurely ribbed, glabrous or pubescent. **Pappus** of many fine bristles.

Species ± 20, tropical and sthn Afr.; 8 in sthn Afr., summer-rainfall parts but absent from Botswana and Free State.

Macowania Oliv. 9053000

(Gnaphalieae)

Oliver: 49, t. 1062 (1870); Smith: 348 (1927); Phillips: 802 (1951); Henderson: 116 (1961); Hilliard & Burtt: 260 (1976); Anderberg: 51 (1991a); Anderberg: 325 (1994).

Homochaete Benth.: 9, t. 1110 (1876).

Erect or dwarf shrubs, somewhat ericoid, dense or lax, often glandular. **Leaves** alternate, crowded, linear or linear-lanceolate, sessile, apex mucronate or with curved mucro, with revolute or thickened margins, glandular-hairy or woolly (hair type B). **Capitula** radiate, solitary, rarely clustered, terminal, sessile or pedunculate. **Involucre** campanulate or turbinate; bracts in 5–7 rows, glandular or hairy on back; stereome undivided. **Receptacle** flat, smooth or sometimes honeycombed, epaleate. **Ray florets** female, in 1 row, deep yellow, fertile; corolla tubular below, with narrowly elliptic 3-toothed lamina. **Style** branches linear, obtuse at apex; stigmatic papillae confined to marginal bands on inner faces and confluent at branch tips. **Disc florets** bisexual, fertile or rarely functionally male; corolla deep yellow, glandular-hairy, cylindric below, abruptly campanulate or more gradually widened above, 5-lobed. **Anthers** ecalcarate, caudate; with deltoid or oblong-obtuse apical appendage; endothecial tissue polarised. **Style** branches (when fertile) oblong, slightly branched at obtuse tips, minute pollen-sweeping papillae on outer faces; stigmatic bands marginal on inner surfaces, not meeting at tip. **Cypselas** cylindric or fusiform, 10–15-ribbed, glabrous or hairy. **Pappus** if present, of acute scabrid bristles, caducous or persistent.

Species 12, Arabian Peninsula and Ethiopia; 10 in sthn Afr., Northern Province, Gauteng, Mpumalanga, KwaZulu-Natal and Eastern Cape.

Mairia Nees 8883000

(Astereae)

Nees: 247 (1832); Harvey: 64 (1865) as *Mairea*; Bremer: 425 (1994); Nesom: 90 (1994).

Perennial herbs with vestiture of flexuous, thin-based hairs. **Leaves** in basal rosette, thick, broadly obovate, crenate or entire. **Capitula** radiate, solitary, terminal, on long, bracteate peduncles, rarely corymbose. **Involucre** campanulate; bracts in 3–5 rows. **Receptacle** flat, honeycombed, sometimes with rims of pits slightly produced, epaleate. **Ray florets** female, fertile; with staminodia; corolla white, pink or purple; tube cylindric, with 3-toothed, elliptic or spathulate lamina. **Style** terete, sometimes undivided; branches linear, obtuse. **Disc florets** bisexual, fertile; corolla yellow; tube cylindric below, tubular or gradually expanding above and 5-lobed. **Anthers** linear, ecalcarate and ecaudate; with lanceolate

or ovate, apical appendage. **Style** terete or linear, with linear or lanceolate branches. **Cypselas** narrowly oblong to oblong-oblanceolate, (2 or 3)4–6-nerved, flattened but plump, glandular and often densely strigose-sericeous, surface tan at maturity. **Pappus** persistent, 1 or 2 rows of plumose bristles, or inner row of bristles and outer row of scales.

Species 3, endemic to sthn Afr., Western Cape.

*Mantisalca Cass. 9476010

(Cardueae)
Cassini: 142 (1818); Dostál: 254 (1976); Bremer: 153 (1994).

Annual or perennial herbs, unarmed. **Leaves** alternate, dentate-pinnatifid. **Capitula** discoid or disciform, pedunculate, solitary. **Involucre** urceolate, much shorter than florets; bracts appressed, coriaceous; appendage a short, erect to deflexed, deciduous spine. **Marginal florets** neuter; with staminodes; corolla purple, rarely white, longer than bisexual central florets. **Disc florets** bisexual, fertile; corolla purple, rarely white. **Anthers** caudate at base. **Cypselas** obovoid, many-ribbed and transversely rugulose between ribs, glabrous with apical rim, lateral detachment area large and surrounded by whitish, swollen margin, with elaiosome. **Pappus** double, outer of linear-subulate, persistent scales; inner generally a single, abaxial scale. $x = 11$.

Species 4, Mediterranean region, North Africa; 1 an introduced weed in sthn Afr.: **Mantisalca salmantica* (L.) Briq. & Cavill., Northern and Eastern Cape.

Marasmodes DC. 9370000

(Anthemideae)
Candolle: 136 (1838a); Harvey: 175 (1865); Hutchinson: 171 (1916a); Bremer & Humphries: 152 (1993); Bremer: 475 (1994).

Shrubs. **Leaves** alternate, sometimes clustered, entire or occasionally lobed, linear, ± ericoid, glandular-punctate, glabrous. **Capitula** discoid, few-flowered, sessile, closely aggregated at stem tips, rarely solitary. **Involucre** subcampanulate or spindle-shaped; bracts in 6 or 7 rows, ovate, oblong or lanceolate, sometimes inner or all with membranous tip. **Receptacle** flat, epaleate. **Disc florets** bisexual; corolla tube glandular, swollen and with thick vascular strands, ± campanulate above, with 5 ovate lobes. **Anthers** short and comparatively wide, ecalcarate and ecaudate; with linear or lanceolate, apical appendage. **Style** terete, discoid at base, with linear, truncate branches. **Cypselas** 5-ribbed, glandular, with myxogenic cells mainly abaxially; ribs with thick vascular strands. **Pappus** of 7–10 oblong, flat, whitish, adaxially longer scales.

Species 4, endemic to sthn Afr., Western Cape.

*Melanthera Rohr 9204000

(Heliantheae)
Rohr: 213 (1792); Phillips: 816 (1951); Wild: 3 (1965); Hilliard: 311 (1977); Karis & Ryding: 595 (1994).

Annual or perennial herbs, sometimes scandent. **Leaves** opposite, sessile or petiolate, usually scabrid or hairy, margins toothed, rarely 3-lobed. **Capitula** discoid or radiate, many-flowered, solitary or in lax corymbs. **Involucre** hemispherical; bracts in 1–3 rows, inner enfolding ray florets. **Receptacle** convex or conical, paleate; paleae oblong to obovate, boat-shaped, conduplicate and enclosing disc florets. **Ray florets** female, fertile or sterile; corolla yellow, strap-shaped, lamina 2- or 3-toothed, longer than tube; ovary keeled on face or with narrow, marginal wings. **Disc florets** bisexual, fertile; corolla yellow; tube slightly widened upwards and abruptly contracted at base, 5-toothed. **Anthers** obtuse or shortly sagittate at base; with ovate, apical appendage. **Style** swollen at base, with linear, apiculate, glandular-pilose branches. **Cypselas** obovoid, 3- or 4-angled, laterally compressed, apically usually truncate or concave. **Pappus** of caducous awns or bristles. $x = 5$ (8—1 report) (polyploidy).

Species 20, SE United States, Mexico, Central America, West Indies, tropical Africa; 4 naturalised in sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Metalasia R.Br. 9043000

(Gnaphalieae)
Brown: 124 (1817); Harvey: 265 (1865); Pillans: 47 (1954); Hilliard & Burtt: 218 (1981); Karis: 1 (1989); Anderberg: 73 (1991a); Anderberg: 332 (1994).

Endoleuca Cass.: 47 (1819e).

Shrublets with greyish-woolly branches. **Leaves** alternate, often of 2 sizes, sessile, ericoid, often pungent, usually twisted, with margins often incurved. **Capitula** discoid, 3–8(–13)-flowered, crowded at ends of branchlets, sessile or subumbellate, rarely solitary; florets bisexual, fertile or some sterile. **Involucral bracts** with undivided stereome, narrowly campanulate or cylindric; bracts in 4–6 rows, outer bracts oblong, usually acuminate, woolly on back, innermost bracts linear, with large, white or coloured appendage at apex. **Receptacle** epaleate. **Ray florets** 0. **Disc florets** cylindric, becoming subcampanulate upwards, thick-textured, often reddish on upper part with 5 small, deltoid, whitish, glabrous lobes. **Anthers** tailed at base, with a lanceolate, apical appendage. **Style** linear, swollen at base, branches truncate or slightly rounded, sweeping hairs extending briefly down backs of branches, stigmatic areas separated, sometimes joined at tip. **Cypselas** oblong or elliptic, ribbed or angled, often asymmetrical, rarely somewhat winged, tapered at both ends, glabrous or papillate; annulus 0. **Pappus** of many scabrid bristles in 1 row, tips flattened and ± clavate, as long as corolla. $x = 7$.

Species 52, 47 species endemic to the Western Cape; *Metalasia muricata* (L.) D.Don and *M. trivialis* Karis in Western and Eastern Cape; *M. aurea* D.Don and *M. massonii* S.Moore in Eastern Cape; *M. densa* (Lam.) Karis, widespread in Northern Province, Gauteng, Mpumalanga, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

Microglossa DC. 8921000

(Astereae)
Candolle: 320 (1836a); Grau: 399 (1976); Hilliard: 78 (1977); Bremer: 425 (1994).

Nidorella Cass. in part, Harvey: 87 (1865).

Shrubs, often scandent or twining. **Leaves** alternate, entire or toothed, petiolate or subsessile, lanceolate or deltoid, glabrous to thinly hairy, sometimes glandular. **Capitula** radiate, corymbose-paniculate, terminal; peduncles sometimes bracteate. **Involucre** campanulate; bracts in 3 or 4 rows. **Receptacle** flat, epaleate, honeycombed, with rim of pits slightly or distinctly produced. **Ray florets** female; corolla blue or white; tube cylindric, extending into 3-fid lamina. **Disc florets** bisexual and fertile or functionally male; corolla yellow, tubular below, widening above, 3–5-lobed. **Anthers** ecalcarate and ecaudate; with lanceolate, apical appendage. **Style** branches of ray florets linear; of disc florets oblong, tips deltoid, minutely papillose outside and with few sweeping hairs. **Cypselas** elliptic or obovate, somewhat compressed, ribbed, glabrous or thinly pubescent. **Pap-**

pus of caducous scabrid bristles in 1 row. $x = 9$ (7, 10) (polyploidy).

Species ± 10: tropical and sthn Afr., Madagascar and Asia; 2 in sthn Afr.: *Microglossa caffrorum* (Less.) Grau and *M. mespilifolia* (Less.) B.L.Robinson, KwaZulu-Natal and Eastern Cape.

Mikania Willd. 8818000

(Eupatorieae)

Willdenow: 1742 (1803); Harvey: 58 (1865); Merxmüller: 111 (1967a); Hilliard: 54 (1977); Holmes: 213 (1982); King & Robinson: 419 (1987); Bremer *et al.*: 647 (1994).

Herbs or suffrutescent, twining or scrambling perennials. **Leaves** opposite, subsessile or petiolate, frequently cordate or sagittate at base. **Capitula** discoid, 4-flowered, in spikes, racemes or corymbs and often panicled. **Involucre** cylindric; bracts 4 or 5, in 1 row, linear or linear-lanceolate, 3-nerved, sometimes glandular-hairy. **Receptacle** small, naked. **Corolla** white; tube cylindric below, sometimes dilated at base; lobes 5, short, ovate. **Anthers** linear, obtuse at base; with ovate, membranous, apical appendage. **Style** with branches elongate, clavellate or filiform. **Cypselas** pentagonal, prismatic or tapering downward. **Pappus** of many scabrid bristles. $x = 9$ (7, 10, 17, 19) (aneuploids, high polyploidy, B-chromosomes).

Species ± 430, pantropical; 3 in sthn Afr., occurring in N Namibia, Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Mikaniopsis Milne-Redh. 9411100

(Senecioneae)

Milne-Redhead: 27 (1956); Jeffrey: 878 (1986); Bremer: 505 (1994).

Senecio L. in part, Hilliard: 499 (1977).

Scandent, twining, perennial herbs or subshrubs. **Leaves** alternate, deltoid-ovate in outline, 3–5-angled or shallowly lobed, thick-textured, palmately veined, base broadly cuneate to subtruncate; petioles basally thickened and climbing, exauriculate. **Capitula** disciform, paniculate-corymbose. **Involucre** calyculate, narrowly campanulate; bracts 5–7. **Receptacle** flat, epaleate. **Marginal florets** female, similar to disc florets. **Disc florets** bisexual, fertile; corolla creamy white or pale yellow; tube cylindrical; limb campanulate, 5-lobed. **Anthers** ecalcarate, caudate; endothecial tissue radial. **Style** branches truncate, penicillate, tipped with short cone. **Cypselas** oblong, ribbed, glabrous. **Pappus** of many fine bristles. $x = 10$ (polyploidy—1 report).

Species ± 15, tropical Africa, 1 in sthn Afr.: *Mikaniopsis cissampelina* (DC.) C.Jeffrey, Northern Province, Mpumalanga, KwaZulu-Natal and Eastern Cape.

***Montanoa** La Llave & Lex. 9170000

(Heliantheae)

La Llave & Lexarza: 11 (1825); Wild: 57 (1967); Hilliard: 305 (1977); Funk: 1 (1982); Karis & Ryding: 583 (1994).

Shrubs. **Leaves** opposite, petiolate, broadly ovate, palmately lobed, finely toothed, softly pubescent. **Capitula** radiate, in corymbose panicles. **Involucre** hemispherical; bracts in 1–3 rows. **Receptacle** convex or conical; paleae conduplicate, becoming very large and papery after anthesis. **Ray florets** neuter; corolla strap-shaped, white. **Disc florets** bisexual, fertile; corolla yellow, tubular below, campanulate above, 5-lobed. **Anthers** obtuse at base, apical appendage narrowly deltoid. **Style** branches oblong, apices deltoid, papillae present on outside. **Cypselas** obpyramidal or obovoid, ± 4-angled, apically with ring-shaped collar. **Pappus** 0. $x = 19$ (aneuploids).

Species 25, in Mexico, Central America, northern part of South America; a species from Mexico: **Montanoa hibiscifolia* Benth. has become naturalised, mainly in the coastal areas of KwaZulu-Natal and at Port St Johns (Eastern Cape).

Myxopappus Källersjö 9366030

(Anthemideae)

Källersjö: 314 (1988); Bremer & Humphries: 155 (1993); Bremer: 476 (1994).

Pentzia Thunb.: 145 (1800), in part excluding type.

Pubescent annual herbs. **Leaves** alternate, variously pinnatisect. **Capitula** discoid, solitary, pedunculate. **Involucre** hemispherical; bracts in 3–5 rows, very narrow and acute, without scarious margins, often with central resin canal. **Receptacle** convex or conical, epaleate. **Disc florets** bisexual; corolla generally 5- but occasionally 4-lobed; tube almost cylindrical; limb urceolate and partly enervate. **Anthers** ecalcarate and ecaudate. **Style** branches with resin ducts. **Cypselas** white when mature, with 2 lateral and 1 adaxial rib, myxogenic on ribs and abaxial surface, and with short-stalked glands in grooves between ribs; pericarp containing large number of druses, several cell-layers thick in ribs, but abaxially thin. **Pappus** an entire corona, covered with myxogenic cells.

Species 2, endemic to sthn Afr.: *Myxopappus acutilobus* (DC.) Källersjö and *M. hereroensis* (O.Hoffm.) Källersjö, Namibia and Namaqualand (Northern Cape).

Nestlera Spreng. 9048000

(Gnaphalieae)

Sprengel: 568 (1818); Harvey: 295 (1865); Anderberg & Bremer: 1061 (1991); Anderberg: 332 (1994).

Relhania L'Hér. in part, Bremer: 1 (1976a).

Subshrubs or shrubs, rarely annual, sometimes prostrate, dichotomously branched; often with thick tap-root. **Leaves** alternate or opposite. **Capitula** radiate, few- to several-flowered, solitary, terminal, or sessile in forks of branches, rarely subumbellate, sometimes shortly pedunculate. **Involucre** cylindric to ellipsoid; bracts in 4–11 rows, sometimes with a membranous appendage. **Receptacle** nude, or sometimes honeycombed and sometimes with rims of pits produced. **Ray florets** female; corolla tube cylindric, with somewhat elliptic, 3-toothed lamina; ovary ± oblong, sometimes hairy. **Style** slender, with linear, obtuse branches. **Pappus** a crown of short setae. **Disc florets** bisexual, sterile or fertile; corolla tube widened above, with 4 or 5 lanceolate lobes. **Anthers** tailed or rarely eared, with a lanceolate, rarely oblong, bifid, apical appendage. **Ovary** linear or oblong. **Style** slender, with linear, truncate, penicillate branches, undivided in sterile florets. **Pappus** a crown of short, unequal paleae, rarely with 2 barbellate bristles as long as corolla tube.

Monotypic: *Nestlera biennis* (Jacq.) Spreng., endemic to Northern and Western Cape.

Nicolasia S.Moore 8951000

(Plucheeae)

Moore: 458 (1900b); Merxmüller: 1 (1954b); Merxmüller: 113 (1967a); Anderberg: 161 (1991c); Anderberg: 301 (1994).

Shrublets, subshrubs or annuals. **Leaves** alternate, narrow, entire to dentate, generally decurrent, sometimes strongly 1-nerved on lower surface and with thickened margins, sparsely hairy. **Capitula** disciform, pedunculate, solitary at ends of branches or few together. **Involucre** ovoid or campanulate; bracts in 5–7 rows, sometimes apiculate, glandular. **Receptacle** flat, epaleate.

Marginal florets female; corolla filiform, 3-lobed. **Disc florets** bisexual, tubular, 5-lobed. **Anthers** calcarate, ecaudate, cells of filament collar flattened; endothecial tissue radial. **Style** bifid; style branches with obtuse sweeping hairs reaching below the furcation. **Cypselas** stout, ellipsoid, with straight hairs. **Pappus** of few free, barbellate, capillary bristles in 1 row.

Species 7, Africa; 6 in sthn Afr., mainly northern areas of Namibia, Botswana, Northern Province and North-West.

Nidorella Cass. 8925000

(Astereae)

Cassini: 469 (1825a); Harvey: 86 (1865); Merxmüller: 117 (1967a); Wild: 209 (1969c); Wild: 62 (1975); Hilliard: 79 (1977); Bremer: 427 (1994).

Annual or perennial herbs, variably hairy. **Leaves** alternate, entire or variously lobed. **Capitula** disciform or inconspicuously radiate, small, in subglobose or cymose corymbs, terminal. **Involucre** hemispherical to campanulate; bracts in 1–3 rows, usually with membranous margins and glandular. **Receptacle** flat or convex, usually honeycombed with rim of pits sometimes produced, epaleate. **Ray florets** female, in few to many rows; corolla yellow; tube cylindric, puberulent, strap-shaped or sometimes shortly 3- or 4-(5)-lobed; lamina narrow or elliptic, entire or 2- or 3-toothed. **Style** filiform, with linear branches. **Disc florets** bisexual and usually fertile; corolla yellow; tube ± funnel-shaped, 5-lobed, puberulent. **Anthers** ecalcarate and ecaudate, with lanceolate, apical appendage. **Style** broadly triangular above, outer surfaces with triangular, coarsely papillose branches. **Cypselas** obovoid or ellipsoid, often somewhat compressed, pubescent and often glandular. **Pappus** of barbellate bristles in 1 row, not or scarcely accrescent when mature; florets readily visible among pappus. $x = 9$.

Species ± 13, mainly Africa, 1 in Madagascar; 11 in sthn Afr.; widespread.

Nolletia Cass. 8929000

(Astereae)

Cassini: 479 (1825a); Merxmüller: 118 (1967a); Hilliard: 96 (1977); Bremer: 427 (1994).

Leptothamnus DC.: 367 (1836a); Harvey: 111 (1865).

Shrubs or subshrubs. **Leaves** alternate, entire, linear or subulate, often rigidly ciliate. **Capitula** disciform, medium-sized or small, solitary or laxly corymbose, on long, terminal peduncles. **Involucre** campanulate; bracts in 3 rows, sometimes ribbed, with membranous margins. **Receptacle** flat, epaleate, sometimes honeycombed. **Marginal florets** female, in 1 row, filiform, minutely 2- or 3-toothed at apex, yellow. **Style** filiform, with linear branches. **Disc florets** bisexual, fertile or sterile, tubular below, somewhat campanulate above, 5-lobed, yellow. **Anthers** ecalcarate and ecaudate; with lanceolate, apical appendage. **Style** oblong, truncate, penicillate with deltoid apical appendage and conspicuous sweeping hairs. **Cypselas** compressed, obovate or linear-oblong, margined, pubescent. **Pappus** of scabrid bristles in 1 row. $x = 9$ (1 report).

Species ± 10, Africa; 8 in sthn Afr., widespread but absent from Western Cape.

Oedera L. 9322000

(Gnaphalieae)

Linnaeus: 291 (1771); Harvey: 134 (1865); Anderberg: 68 (1991a); Anderberg: 332 (1994).

Eroeda Levyns: 83 (1948).

Shrublets, rather rigid and somewhat ericoid. **Leaves** opposite, ternate or spirally imbricate, ovate to linear. **Capitula** radiate, few-flowered, in terminal sessile clusters within a common involucre. **Involucre** broadly campanulate; bracts in 3 or 4 rows, ovate, lanceolate, ciliate, sometimes glandular on margins, pubescent or scabrid on back. **Receptacle** paleate; paleae acuminate or obtuse, sometimes fimbriate or irregularly 2- or 3-toothed. **Ray florets** female, marginal, corolla tube somewhat compressed, with long linear, minutely toothed lamina, much longer or somewhat shorter than tube. **Style** linear, with linear, obtuse or truncate branches. **Pappus** a crown of short paleae. **Disc florets** bisexual, fertile or some sterile; corolla tube campanulate or abruptly widening above. **Anthers** linear, obtuse at base, with a lanceolate, apical appendage. **Ovary** linear, glabrous. **Style** terete, with linear, truncate branches. **Pappus** a crown of short paleae.

Species 18, endemic to Western and Eastern Cape.

Oldenburgia Less. 9500000

(Mutisieae)

Lessing: 252 (1830); Candolle: 12 (1838b); Harvey: 512 (1865); Marloth: 282 (1932); Phillips: 50 (1951); Bond: 493 (1987); Bremer: 103 (1994).

Low trees or dwarf shrubs with thick stems covered with remains of old leaf bases. **Leaves** alternate, rosulate at ends of branches, obovate or elliptic, convex above, apex obtuse or subacute, base cuneate but expanded at junction with stem, densely silky-woolly, margin subrevolute; young leaves densely tomentose with projecting and conspicuous veins. **Capitula** radiate, large, sessile or pedunculate. **Involucre** ovoid, globose-urceolate or cyathiform; bracts in 4–10 rows, outer shorter than inner. **Receptacle** flat, epaleate, alveolate. **Ray florets** female; corolla white, bilabiate, outer lip long, strap-shaped or tripartite, inner lip of 2 delicate, linear, curled lobes; tube cylindrical. **Anthers**: filaments filiform; stamens lanceolate, without apical appendages, bases sagittate, tailed. **Style** terete, with very short branches. **Disc florets** many, regular, tubular, deeply 5-lobed. **Stamens** as in ray florets but with lanceolate, sterile apices. **Gynoecium** as in ray florets. **Cypselas** fusiform, elliptic or linear, glabrous and ribbed or villous. **Pappus** of 11–30 plumose or barbellate bristles, often of unequal length. $x = 9$ (polyploidy).

Species 4, endemic to sthn Afr., southern parts of Western and Eastern Cape.

Oligocarpus Less. 9424000

(Calenduleae)

Lessing: 90 (1832); Nordenstam: 375 (1994).

Osteospermum sect. *Oligocarpus* (Less.) Norl.: 346 (1943). *Xenismia* DC.: 509 (1836a).

Annual, glandular-puberulous herbs. **Leaves** alternate, petiolate to sessile, oblong to oblong-lanceolate, entire or shallowly lobed or toothed. **Capitula** radiate, small, solitary. **Involucre** campanulate or hemispherical with subequal bracts ± in 1 row. **Ray florets** female, fertile; lamina short, yellow. **Style** shallowly bilobed with apical ring of hairs. **Cypselas** polymorphic, slightly curved and wingless, or straight and 3-winged, or rostrate and wingless, with or without apical cavity, smooth or rugose-aculeate. **Disc florets** functionally male, yellow. **Anthers** ecalcarate and caudate; endothecial tissue polarised. **Pappus** 0.

Monotypic, endemic to sthn Afr.: *Oligocarpus calendulaceus* (L.f.) Less., KwaZulu-Natal, Northern, Western and Eastern Cape.

Oligothrix DC. 9416000

(Senecioneae)

Candolle: 304 (1838a); Harvey: 306 (1865); Bremer: 506 (1994).

Annual herbs, small and delicate. **Leaves** alternate, sessile, linear to linear-spathulate, shortly amplexicaul, sometimes toothed. **Capitula** radiate, few-flowered, small, laxly corymbose. **Involucre** ecalyculate, campanulate; bracts in 1 row, lanceolate, connate below, glabrous. **Receptacle** flat, epaleate. **Ray florets** female; corolla white or yellow; tube with elliptic, 3-toothed lamina ± twice its length. **Disc florets** bisexual, fertile; corolla yellow; tube campanulate above, with 5 ovate, cucullate lobes. **Anthers** ecalcarate and ecaudate; with oblong, apical appendages; endothecial tissue radial. **Style** terete, somewhat swollen at base, with linear, truncate, penicillate branches. **Cypselas** ellipsoid, ribbed, sparsely pubescent. **Pappus** of few delicate, barbellate, caducous bristles.

Monotypic, endemic to sthn Afr.: *Oligothrix gracilis* DC., Western Cape, very rare.

Oncosiphon Källersjö 9366020

(Anthemideae)

Källersjö: 310 (1988); Bremer & Humphries: 152 (1993); Bremer: 476 (1994).

Matricaria L.: 891 (1753), in part excluding type. *Pentzia* Thunb.: 145 (1800), in part excluding type.

Glabrous or pubescent annual herbs. **Leaves** alternate, variously pinnatisect. **Capitula** radiate or discoid, solitary or in corymbs, pedunculate. **Involucre** subglobose; bracts in several rows, apically obtuse or acute, with scarious margins, with or without central resin canal. **Receptacle** flat, convex or conical-globose, epaleate. **Ray florets**, if present, female, fertile, strap-shaped; corolla white. **Disc florets** bisexual; corolla always 4-lobed; lobes often cucullate; tube conspicuously swollen and of thick and brittle texture; limb campanulate and partly enervate. **Anthers** ecalcarate and ecaudate. **Style** branches with or without central resin canal. **Cypselas** yellowish brown, ± terete but tapering at base, 4-ribbed, with abaxial entire or toothed rim, glandular between ribs especially on adaxial side; pericarp very thin; epicarpic cells ± sclerenchymatous, elongated with narrow lumina; testa epidermis cells with thick, sinuate walls. **Pappus** 0. $x = 9$ (aneuploids, B-chromosomes).

Species 8, endemic to sthn Afr., mainly Namibia, Northern and Western Cape, 1 species extending to North-West, Gauteng, Mpumalanga, Free State, Lesotho and Eastern Cape.

Ondetia Benth. 9089000

(Inuleae)

Bentham: t. 1112 (1876); Merxmüller: 120 (1967a); Anderberg: 90 (1991b); Anderberg: 288 (1994).

Perennial herbs. **Leaves** alternate, sessile, linear, decurrent. **Capitula** radiate, solitary, sessile on branchlets and overtopped by subtending leaves. **Involucre** campanulate; bracts in 7 rows, oblong, with wide, membranous margins and ovate, membranous apex ending in awn. **Receptacle** flat, paleate; paleae flattened. **Ray florets** female; corolla yellow, minutely 3-toothed. **Disc florets** bisexual, fertile; corolla yellow; tube somewhat narrowing upwards, deeply lobed. **Anthers** long-calcarate, shortly caudate; with lanceolate, apical appendage; endothecial tissue polarised. **Style** branches with acute sweeping hairs not reaching below furcation. **Cypselas** villous. **Pappus** of bristle-like scales.

Monotypic, endemic to sthn Afr.: *Ondetia linearis* Benth., Namibia.

Oreoleysera K.Bremer 9052010

(Gnaphalieae)

Bremer: 450 (1978); Anderberg & Bremer: 1069 (1991); Anderberg: 67 (1991a); Anderberg: 333 (1994).

Compact woody perennials, forming dense tufts. **Leaves** alternate, sessile, narrowly oblong, flattened, greyish tomentose on both surfaces, eglandular, margin entire. **Capitula** radiate, solitary, terminal on long leafless peduncles. **Involucral bracts** with lanceolate laminas. **Receptacle** flat, epaleate. **Ray florets** female, in one row, fewer than disc florets, yellow with purple bands dorsally; cypselas and pappus as in disc florets. **Disc florets** perfect, yellow, glandular-hairy. **Anthers** ecalcarate with short tails; apical appendage acute; endothecial tissue polarised. **Style** branches truncate with obtuse sweeping hairs apically. **Cypselas** rod-like with 5 vascular bundles, moderately hairy with elongated twin hairs. **Pappus** of free, barbellate, capillary bristles in one row with an outer row of very narrow scales.

Monotypic: *Oreoleysera montana* (Bolus) K.Bremer, endemic to Western Cape.

Osmitopsis Cass. emended K.Bremer 9098000

(Anthemideae)

Cassini: 154 (1817d); Harvey: 305 (1865); Phillips: 811 (1951); Bremer: 22 (1972); Bremer: 471 (1994).

Osmites L.: 24 (1760). *Bellidiastrum* Less.: 383 (1832).

Subshrubs or shrublets, sometimes tomentose, aromatic, camphor-scented. **Leaves** usually alternate, sessile, narrow, sometimes reflexed, sometimes toothed or rigidly ciliate. **Capitula** radiate, few- to many-flowered, solitary, terminal or few in corymb. **Involucre** campanulate; bracts in 2–4 rows, imbricate, subequal, laterally and apically purplish, usually fimbriate, serrate, dentate or entire. **Receptacle** flat to conical, paleate; paleae as long as disc florets and somewhat enclosing them, linear to lanceolate, sometimes fimbriate, membranous. **Ray florets** neuter or female, fertile or sterile; corolla white, with ± cylindrical widening tube; lamina entire or bifid, longer than tube. **Disc florets** bisexual, sometimes sterile; corolla yellow, tubular, gradually widening upwards, lobes 5, ovate-triangular, thickened at apex. **Anthers** linear with sterile, flat, ovate to oblong, rounded to truncate, apical appendage; tails flat, subulate, ± connate in pairs. **Style** terete, bifid, with swollen base; branches semiterete, linear to oblong, penicillate; stylopodium present or 0. **Cypselas** glabrous, dotted all over with resin grains, brown, oblong to elliptic to obovate, somewhat 3- or 4-edged. **Pappus**, if present, crown-like, light brown, of scarious, subulate to triangular scales.

Species 9, endemic to sthn Afr, occurring in Eastern and Western Cape.

Osteospermum L. 9427000

(Calenduleae)

Linnaeus: 923 (1753); Harvey: 433 (1865); Norlindh: 98 (1943); Norlindh: 148 (1954); Norlindh: 387 (1960); Nordenstam: 375 (1994).

Annual or perennial herbs, shrublets or shrubs. **Leaves** alternate, rarely opposite, entire or variously divided to pinnatipartite. **Capitula** radiate, pedunculate, usually terminal and solitary, several- to many-flowered. **Involucre** campanulate, subhemispherical or turbinate; bracts in 1–4 rows, free. **Receptacle** flat or slightly convex, epaleate. **Ray florets** female, fertile; corolla yellow or orange yellow; tube short, with ± oblong, 3-toothed lamina up to 6 times its length. **Staminodes** sometimes present. **Style** linear, with linear, obtuse branches. **Ray cypselas** straight or somewhat curved, triquetrous, 3-

winged or terete, smooth or ribbed or tuberculate or with various processes, with or without apical cavities. **Pappus** 0. **Disc florets** functionally male; corolla yellow; tube widening above, with 5 lanceolate lobes. **Anthers** ecalcarate, shortly tailed; with ovate, apical appendage; endothecial tissue polarised. **Style** terete or linear, minutely bifid with apical ring of hairs. **Pappus** 0. $x = 8, 9, 10$ (polyploidy).

Species ± 45, south and tropical Africa, St Helena, Somalia and SW Arabian Peninsula; 35 in sthn Afr., widespread.

Othonna L. 9420000

(Senecioneae)

Linnaeus: 924 (1753); Harvey: 327 (1865); Hilliard: 513 (1977); Bremer: 506 (1994).

Shrubs, subshrubs or perennial herbs, sometimes succulent, with thickened rootstock, usually glabrous. **Leaves** alternate, sometimes radical, sessile or petiolate, varying from linear to orbicular, entire to serrate-dentate or pinnatifid. **Capitula** radiate, disciform or discoid; many-flowered, solitary to corymbose or paniculate, terminal or axillary, on short or long peduncles. **Involucre** ecalyculate, campanulate; bracts in 1 row, connate below, sometimes with membranous margin, glabrous. **Receptacle** flat or convex, epaleate. **Marginal florets** female or bisexual, fertile; corolla yellow, white, purple or pink; tube with obovate-elliptic to linear, blunt or 2- or 3-toothed lamina up to 4 times its length, sometimes short and truncate. **Disc florets** functionally male; corolla yellow or whitish, tubular below, widened above, sometimes very short, with 5 ovate lobes. **Anthers** ecalcarate and ecaudate or minutely sagittate at base; with ovate apical appendage; endothecial tissue radial. **Style** of female flowers linear, with linear, obtuse branches, subacute; of fully fertile bisexual flowers truncate and penicillate with small cone-shaped apical appendage; of functionally male flowers undivided, penicillate, tipped with conical or globose appendage. **Cypselas** mostly ellipsoid, glabrous or pubescent, ribbed. **Pappus** of many persistent, rarely caducous, scabrid bristles. $x = 10$ (polyploidy, B-chromosomes).

Species ± 120, Africa, mainly sthn Afr.; Namibia, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Northern, Western and Eastern Cape.

Oxylaena Benth. ex Anderb. 9049010

(Gnaphalieae)

Bentham: 9 (1876); Anderberg: 53 (1991a); Anderberg: 325 (1994).

Shrubs. **Leaves** alternate, sessile, long, deflexed, narrowly linear, straight, mucronate, glandular-hairy, margin slightly revolute, entire. **Capitula** radiate, solitary. **Involucral bracts** cartilaginous, in a few rows; stereome undivided. **Receptacle** flat, epaleate. **Ray florets** female, in 1 row, fewer than disc florets; corolla ?white. **Disc florets** functionally male; corolla yellow, with glandular hairs, lobes erect. **Anthers** ecalcarate, shortly caudate; apical appendage ovate, concave, as wide as thecae; endothecial tissue polarised. **Style branches** obtuse with obtuse sweeping hairs, not reaching the furcation; stigmatic surface basally separated but apically converging(?). **Cypselas** with ± 5 vascular bundles, glabrous; epidermis smooth. **Pappus** 0.

Monotypic: *Oxylaena acicularis* (Benth.) Anderb.; endemic to sthn Afr., Western Cape, rare.

*__Parthenium__ L. 9138000

(Heliantheae)

Linnaeus: 988 (1753); Linnaeus: 426 (1754); Wild: 8 (1967); Hilliard: 294 (1977); Karis & Ryding: 622 (1994).

Annual herbs. **Stem** simple below, branching above into large open panicle. **Leaves** alternate, sessile, simple, elliptic or ovate in outline, deeply bipinnatisect, margins entire. **Capitula** radiate, small, in terminal panicles. **Involucre** campanulate or hemisherical; bracts in 2 or 3 rows, imbricate, outer somewhat smaller than inner. **Receptacle** convex, paleate. **Ray florets** female, fertile; small; corolla white, suborbicular. **Style** bifid; branches linear-lanceolate, obtuse. **Cypselas** compressed, keeled, crowned with persistent corolla, surrounded by inner involucral bract and 2 lateral, concave, receptacular paleae; pappus of 2 recurved awns, forming apparent margin to cypselas, but free from them, hidden by the 2 receptacular paleae to which they are attached at base. **Disc florets** bisexual, functionally male; small; corolla white, funnel-shaped, 5-toothed. **Anthers** with apical appendage, obtuse at base. **Style** undivided. **Ovary** of disc florets abortive. $x = 9, 17$ (6, 8, 29) (aneuploids, high polyploidy, B-chromosomes).

Species 16, North and Central America, northern South America, West Indies; **Parthenium hysterophorus* L., a widespread weed, is naturalised in parts of sthn Afr.: Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Pechuel-Loeschea O.Hoffm. 8943000

(Inuleae)

Hoffmann: 274 (1889a); Merxmüller: 135 (1967a); Anderberg: 106 (1991b); Anderberg: 289 (1994).

Pluchea Cass. in part, Brown: 117 (1909); Phillips: 788 (1951); Wild: 132 (1969a).

Shrubs up to 2 m high, thinly greyish tomentose. **Leaves** alternate, lanceolate, sessile, entire, not decurrent, sericeous. **Capitula** disciform, in loose corymbs. **Involucre** narrowly cyathiform; involucral bracts in several rows. **Receptacle** epaleate. **Marginal florets** female, in 1 row, filiform, purple. **Disc florets** bisexual, purple, lobes short, smooth; epidermis cells without needle-like crystals. **Anthers** minutely calcarate and caudate with branched tails; endothecial tissue polarised; cells of filament collar longer than wide. **Style** with acute sweeping hairs, not reaching furcation, without star-shaped crystals. **Cypselas** ellipsoid, hairy; epidermis without crystals. **Pappus** in 1 row of basally connate, barbellate, capillary bristles.

Monotypic, endemic to sthn Afr.: *Pechuel-Loeschea leubnitziae* (Kuntze) O.Hoffm., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland and Northern Cape.

Pegolettia Cass. 9073000

(Inuleae)

Cassini: 230 (1825b); Harvey: 122 (1865); Anderberg: 158 (1986); Anderberg: 107 (1991b); Anderberg: 289 (1994).

Shrubs, shrublets, annual or perennial herbs. **Leaves** alternate, sessile, filiform, lanceolate, oblong or spathulate in outline, entire, serrate or dentate to pinnatifid, with conspicuous short glands, in some species with glandular hairs and/or bristly hairs. **Capitula** discoid, solitary to laxly corymbose, pedunculate, terminal. **Involucre** narrowly to broadly cyathiform; bracts in 3 or 4 rows, lanceolate to narrowly oblong or narrowly obovate, dorsally glandular and marginally ciliate. **Receptacle** flat, epaleate. **Disc florets** bisexual; corolla yellow or occasionally purplish or turning purplish with age; tube gradually attenuating towards base, basally widened into ring-shaped foot, widening upwards, glandular, 5-lobed, lobes triangular. **Anthers** minutely calcarate, caudate, with branched tails; with lanceolate, apical appendage; endothecial tissue polarised. **Style** bifid; style branches linear to spathulate; with acute sweeping hairs not reaching furcation. **Cypselas** terete to somewhat flattened, cylindrical, ribbed, glandular-hairy.

Pappus of barbellate or plumose bristles in 1 or several rows and outer row of entire or incised to almost bristle-like scales. $x = 10$ (1 report).

Species 9, Africa and Middle East; 9 in sthn Afr., widespread but absent from North-West.

*Pentanema Cass. 9061060

(Inuleae)
Cassini: 74 (1818); Rechinger: 96 (1980); Anderberg: 100 (1991b); Anderberg: 289 (1994).

Vicoa Cass.: 418 (1829b); Bentham: 334 (1873a); Oliver & Hiern: 361 (1877).

Annual herbs. **Leaves** alternate, oblong to lanceolate, entire or toothed, often villose. **Capitula** radiate, pedunculate, solitary. **Involucral bracts** in many rows, narrow, imbricate, ± scarious, finely pointed. **Receptacle** epaleate. **Ray florets** female; corolla yellow, strap-shaped, 3-toothed. **Disc florets** bisexual; corolla yellow, tubular, 5-toothed. **Anthers** ecalcarate, caudate, with branched tails; endothecial tissue radial. **Style** with acute sweeping hairs, not reaching furcation. **Cypselas** ellipsoid. **Pappus** of barbellate bristles in 1 row. $x = 9$ (10, 17—1 report) (polyploidy).

Species ± 18, Asia, India, Afghanistan, Pakistan, Africa; 1 naturalised in sthn Afr.: **Pentanema indicum* (L.) Y.Ling, North-West.

Pentatrichia Klatt 9061010

(Gnaphalieae)
Klatt: 436, t. 10 (1895); Merxmüller: 138 (1967a); Anderberg: 43 (1991a); Anderberg: 325 (1994).

Shrubs, glandular pilose on young parts. **Leaves** alternate, petiolate or sessile, digitately lobed, cordate at base, pubescent when young. **Capitula** discoid or radiate, solitary, pedunculate, sometimes 2 together or corymbose. **Involucre** campanulate; bracts in 7 rows, linear, acute, scarious, glabrous; stereome undivided. **Receptacle** flat, honeycombed, epaleate. **Ray florets**, when present, female, whitish or yellow, pistillate, in 1 row; staminodia 0. **Disc florets** bisexual, fertile; corolla yellow, tube cylindric, glabrous, with 5 small, lanceolate lobes; lobes strongly retrofracted. **Anthers** ecalcarate, caudate; with lanceolate, apical appendage; endothecial tissue polarised. **Style** bifid; style branches obtuse with obtuse sweeping hairs not reaching furcation; stigmatic surface basally separated but apically confluent. **Cypselas** sparsely hairy with elongated twin hairs and glandular hairs. **Pappus** of few, free, barbellate bristles in 1 row and outer row of short, triangular scales.

Species 4, endemic to sthn Afr.; Namibia, Mpumalanga, Northern and Western Cape.

Pentzia Thunb. 9366000

(Anthemideae)
Thunberg: 145 (1800); Harvey: 171 (1865); Hutchinson: 241 (1916b); Hilliard & Burtt: 328 (1973); Källersjö: 302 (1988); Bremer & Humphries: 151 (1993); Bremer: 477 (1994).

Shrubs or shrublets, cano-pubescent, glandular or glabrous. **Leaves** mostly alternate, rarely opposite, variously pinnatisect, occasionally entire or apically dentate, ± ericoid. **Capitula** discoid, solitary or corymbose, pedunculate, several-flowered. **Involucre** globose; bracts in 3–5 rows, obtuse and with scarious margin. **Receptacle** flat, convex or hemispherical to conical, epaleate. **Disc florets** bisexual, fertile; corolla glandular; tube generally swollen, cylindrical, limb cyathiform-campanulate, with 5 ovate lobes. **Anthers** ecalcarate and ecaudate; with ovate to linear, apical appendage. **Style** terete, sometimes swollen at base; with linear, truncate branches. **Cypselas** yellowish brown, 5-ribbed, ± terete, often with large 2-celled glands and with myxogenic cells abaxially and on ribs. **Pappus** an adaxial auricle, or an oblique adaxially longer cup or of free adaxially whitish scales, sometimes 0. $x = 6, 7, 8$.

Species 23, Africa; 21 in sthn Afr., widespread but absent from Mpumalanga, Swaziland and KwaZulu-Natal.

Perdicium L. 9528020

(Mutisieae)
Linnaeus: 22 (1760); Harvey: 523 (1865); Bremer: 104 (1994).

Perennial herbs, acaulescent. **Leaves** radical, incised along margin, glabrous or woolly. **Capitula** disciform, solitary, on short scapes ± equalling leaves. **Involucre** with scales imbricate, lanceolate. **Marginal florets** female, in 1 row; corolla white, bilabiate, outer lip 3-toothed, inner shorter, bipartite. **Disc florets** bisexual; corolla bilabiate, of same colour as marginal florets. **Anthers** tailed. **Style** shortly 2-lobed; branches scarcely divergent, semiterete, obtuse, pubescent. **Cypselas** ovate-oblong, rostrate. **Pappus** of scabrous bristles in many rows, falling with epigynous disc or annulus.

Species 2, endemic in sthn Afr.: *Perdicium capense* L. and *P. leiocarpa* DC., Western Cape, from the Clanwilliam area to Worcester.

Petalacte D.Don 8995000

(Gnaphalieae)
Don: 552 (1826); Harvey: 288 (1865); Lundgren: 119 (1974); Anderberg: 92 (1991a); Anderberg: 339 (1994).

Perennial herbs or shrublets. **Leaves** alternate, sessile, narrowly obovate-spathulate, narrowly elliptic or narrowly panduriform, margins entire, flat or revolute, densely tomentose to woolly (hair type B). **Capitula** disciform, small, aggregated into terminal cymes or corymbs, several-flowered, pedunculate, densely woolly. **Involucre** ± obovoid; bracts in 4 rows, imbricate, stipitate, woolly, inner large, ovate, petaloid, white; stereome undivided. **Receptacle** flat, paleate; paleae linear, ± as long as florets, outermost resembling involucral bracts. **Marginal florets** female, few, filiform or narrowly tubular, minutely 5-toothed and glandular at apex. **Disc florets** functionally male, outnumbering female florets; corolla tubular, narrowly campanulate above, 5-lobed and glandular at apex. **Anthers** ecalcarate, caudate; with oblong-lanceolate, terminal appendage; endothecial tissue polarised. **Style** in female flowers bifid; branches flattened, linear, obtuse-truncate and with obtuse sweeping hairs apically. **Cypselas** narrowly elliptic, brownish, glabrous or with elongated, nonmyxogenic twin hairs, often subtended by short, scarious, apically laciniate scale. **Pappus** in male flowers of 10–15 bristles in 1 row, as long as to slightly longer than corolla tube, sparsely barbellate to nude below and subplumose at apex, free below; in female flowers more poorly developed.

Monotypic, endemic to sthn Afr.: *Petalacte coronata* (L.) D.Don, Western Cape.

Phaenocoma D.Don 8997000

(Gnaphalieae)
Don: 554 (1826); Harvey: 287 (1865); Anonymous: 388 (1930); Anderberg: 70 (1991a); Anderberg: 333 (1994).

Elichrysum Willd.: 1905 (1803). *Xeranthemum* L.: 858 (1753).

Rigid, erect shrubs, main stem to 60 mm in diameter; branches rigid, upright, covered in brachyblasts borne at right angles to branches, decreasing in size from base of branch to tip, each brachyblast subtended by a narrow

dark brown bract. **Leaves** small, fleshy, knob-like, very densely spaced on branches and brachyblasts, imbricate, abaxial surface woolly-hairy, adaxial surface arachnoid. **Capitula** discoid, terminal, large, with 800–1000 florets. **Involucral bracts** 240–270, with three clearly distinguishable sections: *basal shaft* 6–11 mm long, narrowly transversely elliptic in cross section, strongly hygroscopic, margins with a single row of hairs and glands; *hinge* a dark brown band, up to 2 mm wide between shaft and lamina; *lamina* up to 22 mm long, with a silky sheen, deep pink fading to lighter shades with age; outermost bracts scale-like, with acuminate dark brown tips; innermost bracts with lamina longer and narrower. **Receptacle** conical, nude, honeycombed. **Female florets** discoid, ± 20 per capitulum, positioned at regular intervals between other florets in outermost row closest to involucre, narrowing towards tip to clasp style, with very small, erect, triangular lobes. **Style** bifid; style branches tapering to a narrow, rounded tip, base bulbous. **Cypsela** with long, white, silky hairs. **Pappus** of 100–150 plumose bristles, slightly fused at base, tips acute or rounded. **Male florets** discoid, majority of florets in capitula, progressively younger towards centre, ± same width from base to tip. **Anthers** with apical appendage truncate, basally long frilly-tailed. **Style** not bifid, with swollen cells along upper part of shaft, base bulbous. **Nectary** reduced or 0. **Cypsela** reduced and sterile, smooth, glossy. **Pappus** bristles 20–55, plumose, slightly fused at base, tips bulbously inflated.

Monotypic: *Phaenocoma prolifera* (L.) D.Don, endemic to Western Cape.

Phaneroglossa B.Nord. 9411040

(Senecioneae)

Nordenstam: 66 (1978); Bremer: 507 (1994).

Subshrubs. **Leaves** alternate, linear-lanceolate or oblanceolate, sessile with half-clasping base, coriaceous, with entire to denticulate and often somewhat revolute margins. **Capitula** radiate, solitary, on long peduncles. **Involucre** broadly cup-shaped, ecalyculate; involucral bracts ± 11–15, in 1 row, basally connate, lanceolate, coriaceous, with distinct subscarious margins. **Receptacle** flat and wide, glabrous, smooth, punctate, epaleate. **Ray florets** female, 5–8; tube cylindrical, with few to many gland-tipped hairs; lamina elliptic-oblong, apically trifid, white or cream-coloured. **Style** branches glabrous, apically tipped with conical obtuse appendage. **Cypselas** oblong, with 5 or 6 obliquely curved, wing-like ridges, dark brown to black, glabrous. **Pappus** bristles in many rows, white, barbellate, caducous. **Disc florets** bisexual, many; corolla tubular, apically 5-lobed; lobes ovate, apically papillate. **Anthers** ecalcarate, caudate, bases auriculate; apical appendage ovate, large; endothecial tissue radial. **Style** branches with continuous stigmatic surfaces, apically distinctly conical-convex, outside surface papillate towards apex. **Cypselas** narrowly oblong, with 5 obliquely curved, wing-like ridges, brown, densely hirsute on ridges with mucilaginous hairs. **Pappus** bristles in many rows, white, barbellate, persistent.

Monotypic, endemic to sthn Afr.: *Phaneroglossa bolusii* (Oliv.) B.Nord., Northern Cape (Namaqualand) and Western Cape.

Philyrophyllum O.Hoffm. 9083000

(Gnaphalieae)

Hoffmann: 206, 208 (1889b); Merxmüller: 146 (1967a); Anderberg: 43 (1991a); Anderberg: 326 (1994); Herman: 107 (1999a).

Perennial herbs, glandular. **Leaves** alternate, petiolate, triangular, glandular-hairy, margin dentate. **Capitula** radiate, small, in loose corymbs. **Involucre** campanulate; bracts in 4 rows, lanceolate, glandular; inner ciliate; stereome undivided. **Receptacle** flat, paleate; paleae linear, as long as disc florets, concave, ciliate. **Ray florets** female; corolla yellow, 3-toothed, in 1 row, fewer than disc florets. **Pappus** a crown of scales. **Disc florets** bisexual, fertile; corolla yellow; tube widening above, 5-lobed, lobes strongly retrofract. **Anthers** calcarate and caudate; apical appendage flat; endothecial tissue polarised. **Style** bifid; style branches obtuse with obtuse sweeping hairs dorsally, not reaching furcation; stigmatic surfaces basally separated but apically confluent. **Cypselas** sparsely hairy with elongated twin hairs and glandular hairs. **Pappus** of few, free, barbellate, caducous bristles in 1 row and small crown of scales.

Monotypic, south-tropical Africa; also Angola and Zimbabwe: *Philyrophyllum schinzii* O.Hoffm., Namibia, Botswana, Northern Province, North-West, Gauteng and Mpumalanga.

Phymaspermum Less. 9336000

(Anthemideae)

Lessing: 253 (1832); Harvey: 160 (1865); Källersjö: 535 (1985); Bremer & Humphries: 94 (1993); Bremer: 451 (1994).

Adenachaena DC.: 49 (1838a); Harvey: 160 (1865). *Brachymeris* DC.: 76 (1838a); Harvey: 163 (1865). *Iocaste* E.Mey. ex Harv.: 160 (1865).

Shrubs or subshrubs, glabrous or pubescent. **Leaves** alternate, small, linear or subterete, sometimes appressed, entire or lobed; often with secondary shoots in axils of primary leaves. **Capitula** radiate or rarely discoid, few-flowered, solitary at apex of branches or laxly corymbose, pedunculate or rarely sessile. **Involucre** campanulate to subglobose; bracts in 4 or 5 rows, sometimes with membranous tip, ciliate, glabrous, sometimes glandular on back. **Receptacle** flat or slightly convex, epaleate. **Ray florets** female, fertile; corolla white or yellow; tube with oblong or elliptic, minutely 3-toothed lamina, 3–4 times longer than tube, glandular. **Disc florets** bisexual, fertile; corolla tube short with distinct campanulate, partly enervate, 5-lobed limb. **Anthers** ecalcarate and ecaudate; with oblong or lanceolate, apical appendage. **Style** terete, sometimes swollen at base, with linear, truncate branches. **Cypselas** ellipsoid-obovoid to terete, with 10–18 rounded ribs, minutely papillose, apically with entire or toothed thickened rim, rarely developing into small crown. **Pappus** 0.

Species 19, Zimbabwe and sthn Afr.; widespread but absent from Botswana and Northern Cape.

***Picris** L. 9575000

(Lactuceae)

Linnaeus: 792 (1753); Linnaeus: 347 (1754); Oliver & Hiern: 447 (1877); Phillips: 853 (1951); Henderson & Anderson: 384 (1966); Hilliard: 604 (1977); Bremer: 199 (1994).

Annual or perennial herbs, roughly hairy, with milky latex. **Stems** erect, branched, ribbed, hispid. **Leaves** rosulate and alternate along stems, entire, coarsely toothed or pinnatifid. **Capitula** ligulate, solitary at ends of branches, rarely corymbose. **Involucre** ovoid-urceolate or campanulate; bracts in several rows, outer ones ovate, pungent, ciliate, inner ones broadly linear or lanceolate-linear, some with long spinous awn from back of apex, setose on back. **Receptacle** flat, honeycombed, epaleate. **Florets** (ligules) bisexual, fertile; corolla yellow, strap-shaped, tube linear, shorter than lamina, sparsely pilose above; lamina broadly linear, truncate, 4- or 5-toothed. **Anthers** linear, sagittate; with oblong appendage. **Style** linear, terete above, pubescent on terete portion; branches linear, obtuse, glabrous. **Cypselas** ellipsoid-fusiform or terete, sometimes attenuate

apically, ribbed, transversely rugose, glabrous. **Pappus** of plumose bristles, rarely reduced to short scales or a corona in outer florets. x = 4, 5 (polyploidy, B-chromosomes—1 report).

Species 45, Europe, Mediterranean region, Asia, mountains of Africa; **Picris echioides* L. is a widespread weed in sthn Afr. whereas **P. hierachioides* L. is known only from KwaZulu-Natal.

Planea P.O.Karis 9043030

(Gnaphalieae)

Karis: 32 (1990); Anderberg: 73 (1991a); Anderberg: 333 (1994).

Much-branched shrublets. **Leaves** in fascicles, involute ericoid, twisted at base, up to 5 mm long, puberulous or glabrous, acute, mucronate. **Capitula** discoid, 5-flowered, corymbose. **Involucral bracts** in 8–11 rows, stereome undivided, outermost bracts green, inner ones reddish above stereome, otherwise whitish to entirely white. **Florets** perfect; corolla narrowly cylindrical with 5 erect, narrowly triangular lobes. **Anthers** with long, acute, abaxially concave apical appendage narrowing at base and with margins of short dorsiventrally erect-spreading cells, tails long, much-branched. **Cypselas** (immature) ovoid, covered with twin-hairs; endocarp of ± 10 cell layer thick testa with a marked pallisade-like epidermis of in transverse-section narrowly oblong, semitransparent cells. **Pappus** bristles serrate, distinctly connate at base into an irregular ring, shaft apically barbellate with free or slightly fused, acute, not clavate cells.

Monotypic: *Planea schlechteri* (L.Bolus) P.O.Karis is endemic to Western Cape.

Platycarpha Less. 9441000

(Arctoteae)

Lessing: 688 (1831); Harvey: 54 (1865); Phillips: 848 (1951); Bremer: 257 (1994).

Perennial herbs, acaulescent, unbranched or with subterranean branches. **Leaves** in rosettes, entire to pinnately lobed, sometimes spinescent, pustulate on upper surface, tomentose beneath. **Capitula** discoid; crowded in large, sessile secondary head in centre of leaf rosette, each capitulum few-flowered. **Involucre** subglobose; bracts in few to many rows, stiff and pungent or herbaceous and woolly. **Receptacle** flat, paleate; paleae ± linear to filamentous. **Florets** bisexual, fertile; corolla purple; tube widened above, glandular-hairy, with 5 linear lobes usually thickened at apex. **Anthers** sagittate or tailed; with ovate to lanceolate, apical appendage. **Style** linear below, terete above with a swelling between; branches short, oblong. **Cypselas** oblong, faintly ribbed. **Pappus** of scales in 1 or 2 rows.

Species 3, endemic to sthn Afr., Namibia, Botswana, North-West, Gauteng, Free State, Northern, Western and Eastern Cape.

Plecostachys Hilliard & B.L.Burtt 8992040

(Gnaphalieae)

Hilliard & Burtt: 206 (1981); Hilliard: 49 (1983); Anderberg: 140 (1991a); Anderberg: 362 (1994).

Perennial herbs or subshrubs; stems long, slender, tangled, thinly white-tomentose, leafy. **Leaves** alternate, small, elliptic to suborbicular, apex obtuse or rounded, sessile or shortly petiolate, margins entire, flat or undulate, upper surface generally cobwebby (hair type B), glabrescent, lower white-tomentose. **Capitula** disciform, small, many in small compact corymbose clusters terminating branchlets. **Involucral bracts** in 3 or 4 rows, inner ± equalling or slightly exceeding florets, tips opaque white, obtuse, radiating; stereome undivided. **Receptacle** shortly honeycombed, flat, epaleate. **Florets** ± 10–40, female flowers 3–30, fewer to more than bisexual flowers, narrowly tubular or filiform; bisexual flowers tubular below, slightly expanded above with 5 deltoid lobes, glandular hairs on backs of all lobes; corolla yellow sometimes tipped pink or purple. **Anthers** ecalcarate, caudate, tails either shorter or slightly longer than filament collar; with small obtuse or subacute deltoid apical appendage; endothecial tissue polarised. **Style** branches truncate and penicillate, short obtuse sweeping hairs extending briefly down backs of branches. **Cypselas** small, oblong, wall flat, apparently without crystals, oblong duplex hairs with swelling cushion always present, myxogenic. **Pappus** bristles scabrid above, bases cohering by patent cilia, lightly fused as well in 1 species; cells with delicate wall thickenings.

Species 2, endemic to sthn Afr.: *Plecostachys polifolia* (Thunb.) Hilliard & B.L.Burtt and *P. serpyllifolia* (P.J.Bergius) Hilliard & B.L.Burtt, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Pleiotaxis Steetz 9499000

(Mutisieae)

Steetz: 499 (1864); Merxmüller: 148 (1967a); Wild: 194 (1972); Bremer: 104 (1994).

Perennial herbs or subshrubs, often with woody rootstock. **Leaves** alternate, usually toothed, frequently cobwebby or tomentose. **Capitula** discoid, terminal, solitary or in few- to many-headed racemes or panicles. **Involucre** ± campanulate or subcylindric; bracts in many rows, closely imbricate, ovate to oblong, obtuse. **Receptacle** epaleate. **Florets** bisexual; corolla white or bright dark red; tube slender below, dilated above, with 5 ± linear lobes. **Anthers** with elongate, ciliate or fimbriate tails. **Style** with branches long, subapically with short hairs, glabrous at tips. **Cypselas** slender, somewhat compressed or 4-angled, glabrous or pilose. **Pappus** of many scabrid bristles.

Species 26, tropical Africa; 2 in sthn Afr.: *Pleiotaxis antunesii* O.Hoffm. in the northern parts of Namibia and *P. eximia* O.Hoffm. in Botswana.

Pluchea Cass. 8941000

(Plucheeae)

Cassini: 31 (1817a); Wild: 132 (1969a); Hilliard: 116 (1977); Anderberg: 164 (1991c); Anderberg: 301 (1994).

Subshrubs or shrubs, rarely perennial herbs, hairy or sometimes glutinous. **Leaves** alternate, dentate to serrate or entire, sessile or subsessile, not decurrent. **Capitula** disciform, mostly in leafless, terminal, corymbose cymes, rarely few or solitary; flowers white, yellow or purplish. **Involucre** ovoid, broadly campanulate or subhemispherical; bracts in few to many rows. **Receptacle** concave or convex, sometimes honeycombed, epaleate. **Marginal florets** female, filiform, 3-lobed, in 1 to few rows. **Style** entire or almost undivided or sometimes divided; style branches with obtuse sweeping hairs reaching below the furcation. **Disc florets** functionally male; corolla tubular, widening upwards, glabrous, with 5 lobes, glandular on margins. **Anthers** calcarate and caudate; endothecial tissue radial. **Cypselas** cylindric, hairy, without resin ducts. **Pappus** of free, barbellate, capillary bristles in 1 row, each bristle with patent teeth. x = 10 (polyploidy).

Species ± 80, Asia, America, Africa and Australia; 4 in sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Poecilolepis Grau 8919020

(Astereae)

Grau: 243 (1977); Bremer: 430 (1994).

Annual or perennial herbs, prostrate to erect. **Leaves** alternate or opposite, entire, linear, somewhat succulent. **Capitula** radiate, solitary, pedunculate. **Involucral** bracts in 3 to many rows, imbricate. **Receptacle** paleate. **Ray florets** female, sterile, white. **Disc florets** bisexual, fertile, yellow. **Anthers** ecalcarate, bases auriculate (shortly caudate); with apical triangular appendages. **Style** branches with broadly triangular appendages and at base with long sweeping hairs. **Cypselas** obovoid, somewhat compressed, ± pubescent. **Pappus** of few, scabrid, caducous bristles in 1 row.

Species 2, endemic to sthn Afr.: *Poecilolepis ficoidea* (DC.) Grau and *P. maritima* (Bolus) Grau, Western and Eastern Cape.

Polyarrhena Cass. 8919010

(Astereae)

Cassini: 173 (1828); Grau: 347 (1970); Bremer: 430 (1994).

Shrublets, usually densely leafy. **Leaves** alternate, entire to slightly toothed, densely hairy to glabrous; hairs usually coarse, sometimes glandular. **Capitula** radiate, solitary, terminal, sessile or pedunculate, or lateral or sometimes clustered on branchlets. **Involucral bracts** in 3 rows, lanceolate, inner row the longest. **Receptacle** epaleate. **Ray florets** female, with upperside white and underside purplish pink, acute. **Stigma** shortly bilobed. **Disc florets** bisexual or more often male or mixed, yellow. **Anthers** ecalcarate and ecaudate; apical appendage ovate-lanceolate, flat. **Style** appendage triangular in fertile florets. **Cypselas** buff or greenish brown to yellow, obtuse, elliptic, with swollen margin, glabrous, with horny ring ± 1 mm deep at upper end. **Pappus** of slender, yellowish white, scabrid, caducous bristles in 1 row.

Species 4, endemic to sthn Afr., Western Cape. Formerly associated with *Aster*, *Felicia*, etc.

Printzia Cass. 9059000

(Gnaphalieae)

Cassini: 324 (1825a); Harvey: 513 (1865); Leins: 108 (1971); Hilliard & Burtt: 368 (1973); Kroner: 108 (1980); Anderberg: 49 (1991a); Anderberg: 326 (1994).

Bojeria DC.: 94 (1836a).

Shrubs, shrublets or perennial herbs. **Leaves** alternate, petiolate or sessile, sometimes leaf bases decurrent, sometimes auriculate, ovate, obovate, elliptic to linear or lanceolate, margin entire to dentate, tomentose or tomentose only beneath (hair type B). **Capitula** radiate or disciform, 1–3 together, sessile or shortly pedunculate on short, axillary branchlets. **Involucre** campanulate; bracts in 3–6 rows, lanceolate to linear, ciliate towards apex, woolly on back; stereome undivided. **Receptacle** slightly convex, honeycombed, epaleate. **Marginal florets** female, in 1 row, white, blue, purple or green; corolla sometimes shortly strap-shaped or filiform, with 3-toothed, oblong or oblong-elliptic lamina longer than tube; staminodes often present. **Style** 2-branched. **Disc florets** bisexual, fertile; corolla yellow, white or purple, rarely green; tube widened above, glabrous, with 5 linear or lanceolate lobes. **Anthers** ecalcarate or calcarate, caudate; apical appendage flat; endothecial tissue polarised. **Style** bifid; style branches obtuse, dorsally with short papillose, obtuse sweeping hairs not reaching furcation; stigmatic surface basally separated but apically converging. **Cypselas** brown, cylindrical, 9–11-ribbed, glandular-hairy and sparsely hairy with elongated twin hairs. **Pappus** persistent, of subbarbellate or subplumose bristles in 2 or 3 rows.

Species 6, endemic to sthn Afr., Mpumalanga, Free State, KwaZulu-Natal, Western and Eastern Cape.

Pseudoconyza Cuatrec. 8940010

(Plucheeae)

Cuatrecasas: 30 (1961); Anderberg: 160 (1991c); Anderberg: 302 (1994).

Herbs, aromatic; stem without resin ducts. **Leaves** alternate, dentate and sometimes basally shallowly lobed, slightly stem-clasping but not decurrent. **Capitula** disciform, terminal, solitary or few together; flowers mauve. **Receptacle** epaleate. **Marginal florets** female; corolla filliform, 3-lobed. **Disc florets** bisexual. **Anthers** calcarate and caudate; cells of filament collar flattened; endothecial tissue radial. **Style** bifid; style branches with obtuse sweeping hairs reaching below the furcation. **Cypselas** distinct, stout, ellipsoid, with straight hairs, without resin ducts. **Pappus** of free, barbellate, capillary bristles in 1 row; each bristle with adpressed teeth.

Monotypic: *Pseudoconyza viscosa* (Mill.) D'Arcy, Central America, Africa and Asia; Namibia, Botswana, Northern Province and Mpumalanga.

Pseudognaphalium Kirp. 8992050

(Gnaphalieae)

Kirpicznikov: 33 (1950); Hilliard & Burtt: 204 (1981); Hilliard: 53 (1983); Anderberg: 146 (1991a); Anderberg: 362 (1994).

Annual, biennial or perennial herbs. **Leaves** alternate, sessile, lanceolate, linear-lanceolate or oblanceolate, sometimes decurrent, margins entire, flat or undulate, both surfaces woolly, or glandular above, woolly below (hair type B). **Capitula** disciform, in small clusters corymbosely or cymosely arranged. **Involucral bracts** in 3 or 4 rows, inner ± equalling or slightly exceeding flowers, white to yellow, often buff or cream; stereome usually divided, rarely undivided (*P. oligandrum*). **Receptacle** smooth or honeycombed, epaleate. **Florets** few to many; female florets more than bisexual florets, corolla yellow, filiform or narrowly tubular; bisexual florets tubular, scarcely broadened above, yellow, 5-lobed; all florets glandular-hairy on backs of lobes. **Anthers** ecalcarate, caudate, tails slightly longer or shorter than filament collar; with small, obtuse or subacute apical appendage; endothecial tissue polarised. **Style** branches truncate and penicillate, with obtuse sweeping hairs. **Cypselas** oblong, either glabrous or with duplex myxogenic hairs; epidermal cells tabular, often imbricate. **Pappus** bristles scabrid, apical cells sometimes inflated, bases cohering by patent cilia. $x = 7$ (1 report).

Species ± 90, Africa, Asia, Europe and America; 3 in sthn Afr., widespread.

Psiadia Jacq. 8923000

(Astereae)

Jacquin: 13, t. 152 (1797); Cufodontis: 1084 (1966); Merxmüller: 150 (1967a); Wild: 23 (1975); Bremer: 430 (1994).

Shrubs, ± viscid at extremities. **Leaves** alternate, petiolate, linear to lanceolate, entire, serrulate or undulate. **Capitula** disciform or shortly radiate, in terminal corymbose cymes, pedunculate. **Involucre** subglobose or campanulate; bracts in 3–5 rows, imbricate. **Receptacle** flat, epaleate. **Ray florets** female, fertile, in several rows, with strap-shaped lamina, 2- or 3-toothed, pale yellow. **Style** branches slender. **Disc florets** male, yellow; corolla funnel-shaped, shortly 5-lobed. **Anthers** obtuse at base, but very shortly 2-dentate. **Cypselas** nar-

rowly turbinate, pubescent. **Pappus** of many barbellate bristles united at base, in 1 row. $x = 9$ (1 report).

Species ± 60, Africa, Madagascar and Asia; 1 in sthn Afr.: *Psiadia punctulata* (DC.) Oliv. & Hiern ex Vatke, Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga and Northern Cape.

Pteronia L. 8862000

(Astereae)

Linnaeus: 1176 (1763); Harvey: 95 (1865); Hutchinson & Phillips: 277 (1917); Bremer: 408 (1994).

Shrublets or shrubs, often viscid, rarely spiny, rarely with decumbent branches rooting at nodes. **Leaves** mostly opposite or alternate, sometimes fascicled, entire or ciliate-serrulate, sometimes coriaceous or succulent, woolly-tomentose, papillose or glabrous, rarely warted. **Capitula** discoid, solitary or corymbose, 1–many-flowered. **Involucre** campanulate to cylindric or ovoid; bracts in 4–10 rows, inner progressively longer, with membranous, glabrous or ciliate margins, sometimes acuminate or spine-tipped. **Receptacle** convex to concave, often honeycombed, margins setose or lacerate. **Florets** bisexual. **Corolla** yellow, rarely purple or greenish; tube usually widening above, often chartaceous; lobes 5, triangular, oblong-linear to obovate. **Anthers** linear, obtuse at base; usually with lanceolate, membranous, apical appendage. **Style** terete; branches usually lanceolate, flattened, with short or long appendages, apex hairy. **Cypselas** obovoid or turbinate or ± compressed, sometimes narrowed into short apical beak, glabrous to villous. **Pappus** usually in 2 rows, of scabrid, barbellate or subpilose bristles, often connate at base, mostly straw-coloured, rarely purple.

Species 70, mainly sthn Afr., Namibia, Botswana, Free State, Northern, Western and Eastern Cape; few extending into Zimbabwe and Australia.

Pulicaria Gaertn. 9078000

(Inuleae)

Gaertner: 461, t. 173 (1791); Harvey: 121 (1865); Hilliard: 281 (1977); Anderberg: 109 (1991b); Anderberg: 290 (1994).

Annual or perennial herbs, villous or subwoolly. **Leaves** alternate, sessile, often cordate-amplexicaul, entire, sinuate or serrate-dentate. **Capitula** radiate or disciform, solitary, often pedunculate, terminal. **Involucre** hemispherical; bracts in 4 or 5 rows, linear, glandular, hairy. **Receptacle** flat, honeycombed, epaleate. **Marginal florets** female; corolla yellow, strap-shaped, rarely filiform, 2- or 3-toothed. **Disc florets** bisexual, fertile; corolla yellow; tube slightly widened upwards, glabrous, 5-lobed. **Anther** bases sagittate, with branched tails, minutely calcarate; with lanceolate, apical appendage; endothecial tissue radial. **Style** branches with acute sweeping hairs, not reaching furcation. **Cypselas** semiterete, ribbed, glandular and hairy. **Pappus** double; outer row of short scales often connate into toothed crown; inner row of few, smooth, caducous bristles. $x = 9$ (6, 7, 10) (polyploidy, B-chromosomes—1 report).

Species 77, Europe, Africa and Asia; 1 in sthn Afr.: *Pulicaria scabra* (Thunb.) Druce, widespread but absent from Botswana and Northern Cape.

Relhania L'Hér. 9050000

(Gnaphalieae)

L'Héritier de Brutelle: 22, t. 29 (1788); Harvey: 298 (1865); Bremer 27 (1976a); Anderberg: 68 (1991a); Anderberg: 333 (1994).

Shrubs, or shrublets, rarely annuals. **Leaves** alternate, rarely opposite, sessile, needle-shaped to lanceolate, very rarely obovate, glandular. **Capitula** radiate, mainly solitary and sessile, rarely pedunculate or corymbose, few- to many-flowered. **Involucre** ellipsoid, ovoid or campanulate; bracts in ± 5 rows, ovate to linear, sometimes bilobed, sometimes with ovate, terminal appendage. **Receptacle** flat or somewhat conical, with linear to broad paleae as long as corolla. **Ray florets** female, yellow, marginal; corolla tube with minutely 3-toothed lamina shorter or longer than tube; ovary linear or oblong, sometimes ribbed. **Style** slender, with linear, obtuse branches. **Pappus** a cup- or crown-like structure or of separate, membranous paleae. **Disc florets** bisexual, fertile or sterile; corolla tube widening above, becoming campanulate; lobes short, ovate. **Anthers** sagittate or tailed at base; ovary linear, sometimes with 2 ciliate ribs, glabrous to pilose. **Style** linear, sometimes swollen at base, branches linear, truncate, rarely rounded. $x = 7$ (5).

Species 13 with 4 subspecies, endemic to sthn Afr., Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

Rennera Merxm. emended P.P.J.Herman 9366010

(Anthemideae)

Merxmüller: 335 (1957); Källersjö: 308 (1988); Bremer & Humphries: 152 (1993); Bremer: 477 (1994); Herman: 373 (1999b).

Perennial herbs or dwarf shrubs, erect to ascending, sometimes rooting at nodes, aromatic. **Leaves** alternate or opposite at base, sessile or petiolate, entire, pinnatifid or bipinnatifid, glabrous or sericeous. **Capitula** discoid, solitary or corymbose, pedunculate. **Involucre** hemispherical; bracts in 3(4) rows, few to many, inner row(s) smaller than outer 2, apically acute or obtuse to spathulate, with scarious margins or inner almost totally membranous, with central resin canal. **Receptacle** hemispherical, epaleate. **Disc florets** bisexual, fertile; corolla yellow, tube narrowly cylindrical and of thin texture; limb globose, partly enervate, 5-lobed; lobes often cucullate; glandular. **Anthers** shortly calcarate and ecaudate, apical appendage ovate. **Style** terete; furcate, branches truncate, penicillate, stigmatic surfaces in 2 separate lines; with resin ducts. **Cypselas** brownish, obovoid, ellipsoid or turbinate, ribbed or angled, sometimes with radiating arms, glandular, but without myxogenic cells, thick-walled and conspicuously tuberculate to rugose, apically sometimes with thick, spreading to revolute corona. **Pappus** 0.

Species 4, endemic to sthn Afr., Namibia, Botswana, North-West and Northern Cape.

Rhynchopsidium DC. 9050020

(Gnaphalieae)

Candolle: 283 (1836b); Bremer: 27 (1976a); Anderberg & Bremer: 1069 (1991); Anderberg: 334 (1994).

Rhynchocarpus Less., name illegitimate.

Annual herbs. **Leaves** alternate or sometimes opposite, straight, adaxially concave, tomentose, glandular-hairy; margin entire. **Capitula** radiate, solitary, sessile or pedunculate. **Involucral bracts** with lanceolate laminas. **Receptacle** flat to convex, paleate; paleae lanceolate with two lateral teeth. **Ray florets** female, yellow with purple bands dorsally, in one row, fewer than disc florets; cypselas and pappus as in disc florets. **Disc florets** bisexual, yellow, often with robust multicellular trichomes. **Anthers** ecalcarate, with short tails; endothecial tissue polarised; apical appendage acute. **Style** branches truncate with obtuse sweeping hairs apically. **Cypselas** narrowly elliptic with three vascular bundles, densely hairy with elongated, apically coiled twin hairs. **Pappus** a crown of ± free scales.

Species 2: *Rhynchopsidium pumilum* (L.f.) DC. and *R. sessiliflorum* (L.f.) DC., endemic to Northern and Western Cape.

Rosenia Thunb. emended K.Bremer 9051000

(Gnaphalieae)

Thunberg: 161 (1800); Lessing: 369 (1832); Candolle: 280 (1838a); Harvey: 294 (1865); Bentham: 327 (1873a); Hoffmann: 198 (1890); Bremer: 104 (1976b); Anderberg: 67 (1991a); Anderberg: 334 (1994).

Densely to moderately branched, compact to diffuse, sometimes spiny shrubs. **Stems** prostrate to erect, glabrous or laxly tomentose, leafy and with lateral brachyblasts with crowded leaves. **Leaves** decussate or sometimes alternate, laxly to densely set, semiamplexicaul, sessile, entire, midribbed, glabrous or tomentose, usually glandular with stalked glands. **Capitula** radiate, solitary, sessile, terminal on stems and brachyblasts, often in fork of two branches. **Involucral bracts** in 3–10 rows, imbricated, entire, basally firm, apically spreading and scarious and sometimes brown with pale margins, otherwise yellowish, glabrous or seldom dorsally tomentose, often glandular. **Receptacle** flat, paleate or epaleate, sometimes shortly squamose. **Ray florets** female, fertile, tube cylindrical-funnel-shaped, sometimes glandular, lamina spreading, elliptic, yellow and sometimes dorsally with a brownish purple stripe, usually 4-veined, apically minutely 3-lobed. **Style** terete, bifid; branches spreading-revolute, semiterete, linear, glabrous or minutely penicillate apically, obtuse; stylopodium 0 or indistinct. **Disc florets** bisexual; corolla yellow, 5-lobed; lobes spreading, ovate-triangular, marginally thickened, dorsally usually gland-dotted. **Style** terete, bifid; branches spreading-revolute, semiterete, narrowly oblong, apically penicillate and truncate; stylopodium ± distinct, conical-terete. **Anthers** linear, with a sterile, flat, ovate, apical appendage and sterile, subulate, entire or slightly branched tails; filaments filiform. **Cypselas** terete or angular, ± narrowly oblong, glabrous or pilose, always more densely pilose in ray florets. **Pappus** crown-like, scarious, of many ± connate scales, often also with 1–4 barbellate, apically slightly flattened bristles. $x = 7$ (1 report).

Species 4, Namibia, Botswana, North-West, Free State, Northern, Western and Eastern Cape.

Schistostephium Less. 9356000

(Anthemideae)

Lessing: 251 (1832); Harvey: 168 (1865); Hutchinson: 99 (1916c); Hilliard: 357 (1977); Bremer & Humphries: 160 (1993); Bremer: 477 (1994).

Peyrousea DC.: 76 (1838a); Bremer: 493 (1977).

Shrubs, subshrubs or perennial herbs, often aromatic, silky villous, pubescent or glabrate. **Leaves** alternate, pinnatisect, lobed, dentate or occasionally entire. **Capitula** disciform or discoid, in terminal corymbs, rarely solitary, on long peduncles. **Involucre** campanulate or subglobose; bracts in several rows. **Receptacle** convex or ovoid-conical, epaleate or rarely with few marginal paleae. **Marginal florets** female, fertile, generally stalked; corolla tubular, compressed, 3- or 4-toothed; or filiform, shorter than style, 2- or 3-fid; or scarcely developed. **Disc florets** bisexual, fertile, or inner functionally male; corolla tubular, somewhat compressed or bluntly 4-angled, sometimes dilated above, 4-toothed. **Anthers** ecalcarate and ecaudate, with suborbicular or ovate apical appendage. **Style** branches linear, truncate, minutely penicillate. **Cypselas** oblong-obovate, somewhat compressed or angled in female florets; in disc florets somewhat compressed, 3- or 4-angled, sometimes keeled or narrowly winged; glabrous or hairy, sometimes glandular. **Pappus** 0.

Species 12, south-tropical Africa; 9 in sthn Afr., Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Eastern Cape and eastern part of Western Cape.

***Schkuhria** Roth 9291000

(Helenieae)

Roth: 116 (1797); Heiser: 267 (1945); Phillips: 820 (1951); Hilliard: 326 (1977); Karis & Ryding: 540 (1994).

Annual herbs, much branched, usually sparsely glandular-pubescent. **Leaves** alternate or opposite below, sessile, dissected or rarely simple, segments narrow, margin entire. **Capitula** radiate or discoid, several-flowered, on long peduncles, terminal and axillary, often corymbosely arranged. **Involucre** turbinate or campanulate; bracts in 1–3 rows. **Receptacle** epaleate. **Ray florets**, when present, female, fertile; corolla yellow, strap-shaped. **Style** branches linear, obtuse. **Disc florets** bisexual, fertile; corolla yellow or tinged reddish, tubular below, campanulate above, 5-toothed. **Anthers** with bases and apical appendage both obtuse. **Style** branches linear, apex rotundate-truncate or shortly appendaged, papillose outside, at least near tips. **Cypselas** narrowly obpyramidal, usually 4-angled, glabrous or pubescent. **Pappus** of 8–10 scales, with prominent midrib sometimes excurrent as awn. $x = 10$ (8, 11, 12) (polyploidy, B-chromosomes—1 report).

Species 6, North and South America; 1 in sthn Afr.: **Schkuhria pinnata* (Lam.) Thell., naturalised and a widespread weed of disturbed areas.

Sclerocarpus Jacq. 9169000

(Heliantheae)

Jacquin: t. 176 (1782); Bentham: 364 (1873a); Oliver & Hiern: 374 (1877); Phillips: 814 (1951); Merxmüller: 161 (1967a); Wild: 37 (1967); Karis & Ryding: 604 (1994).

Annual herbs with branches striate and sparsely pilose. **Leaves** alternate, shortly petiolate, ovate or lanceolate, entire or remotely toothed, strigose beneath. **Capitula** radiate, solitary, peduncled, terminal. **Involucre** campanulate; bracts in 1 row, leafy. **Receptacle** small; paleae cymbiform, clasping florets, becoming contracted above cypsela into ± tubular neck. **Ray florets** neuter; corolla yellow; tube longer than lamina, sparsely glandular-hairy; lamina obovate, shortly bilobed. **Style** 0. **Disc florets** bisexual, fertile; corolla yellow, tubular, slightly widening upwards, 5-lobed; lobes small, linear, sparsely pilose on back. **Anthers** rounded or pointed at base, with linear appendage. **Cypselas** obovate, sometimes oblique above. **Pappus** annular or 0. $x = 6, 11$ (7, 9, 13) (polyploidy).

Species 8, in Central America, Mexico and Africa; 1 in sthn Afr.: *Sclerocarpus africanus* Jacq. ex Murr., northern parts of Namibia and Botswana.

Senecio L. 9411000

(Senecioneae)

Linnaeus: 866 (1753); Harvey: 346 (1865); Hilliard: 387 (1977); Bremer: 508 (1994).

Annual or perennial herbs, subshrubs, shrubs, small trees or vines, very variable in habit and foliage, sometimes succulent. **Leaves** generally alternate, sometimes radical. **Capitula** radiate or discoid, solitary or cymose to corymbose-paniculate. **Involucre** generally calyculate, cylindric, campanulate or hemispherical; bracts mostly in 1 row, rarely in 2, sometimes connate. **Receptacle** always epaleate, flat or somewhat convex. **Ray florets** female, fertile, mostly yellow, sometimes pink, purple, violet, rarely white. **Disc flowers** bisexual or sometimes functionally male; corolla tubular, funnel-shaped or abruptly campanulate above, 5-lobed, yellow, whitish or variously coloured. **Anthers** ecalcarate, ecaudate or sometimes caudate; apical appendage ovate-

lanceolate to oblong, flat; filament collar dilated; endothecial tissue radial. **Style** branches truncate to obtuse, with crown of hairs, without appendages, with discrete stigmatic lines. **Cypselas** ellipsoid-obovoid and ribbed, glabrous or pubescent, sometimes with myxogenic hairs. **Pappus** of many fine bristles, rarely 0. $x = 10$ (7, 9, 11, 12, 23) (aneuploids, high polyploidy, B-chromosomes).

Species ± 1250; cosmopolitan, mostly South America and Africa; ± 300 in sthn Afr., widespread, some weedy, some toxic.

*Sigesbeckia L. 9160000

(Heliantheae)

Linnaeus: 900 (1753); Linnaeus: 383 (1754); Harvey: 132 (1865); Oliver & Hiern: 371 (1877); Bentham: 354 (1873a); Phillips: 814 (1951); Wild: 36 (1967); Hilliard: 300 (1977); Karis & Ryding: 612 (1994).

Annual herbs; stems, leaves and peduncles softly pubescent. **Leaves** opposite, petiolate or subsessile, simple, ovate to lanceolate, margins irregularly toothed. **Capitula** radiate, few-flowered, in lax, leafy panicles. **Involucre** campanulate or hemispherical; bracts in 2 rows: outer bracts spreading or reflexed, spathulate, long, with stalked, viscid glands and multicellular hairs, inner bracts ± enclosing ray cypselas. **Receptacle** convex; paleae embracing disc florets. **Ray florets** female, fertile, small; corolla yellow, strap-shaped, minutely 2- or 3-lobed. **Style** branches short, linear, obtuse. **Disc florets** bisexual, fertile or inner functionally male; corolla yellow, tubular, 3–5-toothed. **Anthers** slightly eared at base, with small apical appendage. **Style** terete, slightly swollen at base; with oblong branches. **Cypselas** ovoid-oblong, often incurved. **Pappus** 0. $x = 10$ (aneuploids, high polyploidy).

Species 3, tropical Africa and Asia; 1 in sthn Afr.: **Sigesbeckia orientalis* L., mainly in eastern forest areas of KwaZulu-Natal and Eastern Cape.

*Silybum Adans. 9464000

(Cardueae)

Adanson: 116 (1763); Henderson & Anderson: 396 (1966); Hilliard: 579 (1977); Bremer: 148 (1994).

Annual or biennial herbs. **Leaves** rosulate to alternate, white-veined to variegated above, sinuate-lobate or pinnatifid, undulate, margins spiny. **Capitula** discoid, solitary, terminal, erect or drooping. **Involucre** broadly subglobose; bracts marginally spiny and spine-tipped. **Receptacle** flat, densely setose. **Florets** bisexual, fertile; corolla purple; tube slender below, abruptly expanded above, deeply 5-lobed. **Anthers** with very short tails; filaments connate into papillose tube. **Style** scarcely thickened below branches, there furnished with ring of short hairs; branches linear-lanceolate, flattened, connate, minutely papillose outside. **Cypselas** obovoid, somewhat compressed, glabrous, attachment scar ± horizontal, central. **Pappus** double: outer row of scabrid, deciduous bristles, basally connate in a ring, inner row of short hairs. $x = 17$ (7).

Species 2, Mediterranean region; **Silybum marianum* (L.) Gaertn. is an introduced weed occurring in Western and Eastern Cape.

Solanecio (Sch.Bip.) Walp. 9411110

(Senecioneae)

Walpers: 273 (1846); Jeffrey: 920, 936 (1986); Bremer: 509 (1994).

Crassocephalum Moench in part, Hilliard: 372 (1977).

Scandent shrubs or lianes, semisucculent. **Leaves** alternate, pinnatifid-lobed, petiolate, auriculate. **Capitula** discoid, few or many, paniculate-corymbose. **Involucre** calyculate; bracts ± 5. **Receptacle** epaleate. **Disc florets** bisexual, fertile; corolla yellow. **Anthers** ecalcarate and ecaudate; endothecial tissue radial. **Style** branches truncate, sometimes with central tuft of fused papillae. **Cypselas** oblong, ribbed, glabrous or pubescent. **Pappus** of many fine bristles.

Species 16, tropical Africa, Madagascar, Yemen; 1 in sthn Afr.: *Solanecio angulatus* (Vahl) C.Jeffrey, Northern Province and KwaZulu-Natal.

*Soliva Ruiz & Pav. 9352000

(Anthemideae)

Ruiz & Pavón: 113, t. 24 (1794); Tutin: 178 (1976); Bremer & Humphries: 159 (1993); Bremer: 477 (1994).

Annual herbs. **Leaves** alternate, pinnatisect. **Capitula** disciform, solitary, sessile, surrounded by leaves. **Involucral bracts** in 2 subequal rows. **Receptacle** convex or conical, epaleate. **Marginal florets** female, fertile, in several rows; tube and lamina 0. **Style** persistent and spinescent in fruit. **Disc florets** functionally male; corolla 3- or 4-lobed. **Anthers** ecalcarate and ecaudate. **Style** branches fused. **Cypselas** glabrous, dorsiventrally flattened, laterally winged; wings sometimes projected into apical teeth, sometimes transversely rugose to sulcate. **Pappus** 0.

Species 8, mainly South America but also North America and Australia; 1 naturalised as weed in sthn Afr.: **Soliva sessilis* Ruiz & Pav., KwaZulu-Natal, Western and Eastern Cape.

Sonchus L. 9595000

(Lactuceae)

Linnaeus: 793 (1753); Linnaeus: 347 (1754); Merxmüller: 3 (1967b); Boulos: 287 (1972); Hilliard: 621 (1977); Pope: 221 (1992); Bremer: 189 (1994).

Annual, biennial or perennial herbs, with milky latex. **Leaves** alternate or sometimes rosulate, often with cauline leaves stem-clasping, entire, dentate, pinnatifid or dissected. **Capitula** ligulate, sessile or peduncled, in irregular corymbose panicles or rarely solitary. **Involucre** ovoid or campanulate; bracts in several rows, ovate to linear, densely tomentose to glabrescent. **Receptacle** flat, honeycombed, epaleate. **Florets** (ligules) bisexual, fertile; corolla yellow, strap-shaped; tube longer than linear or elliptic, shortly 5-lobed lamina. **Anthers** sagittate at base, auricles shortly setaceous-acuminate; with a lanceolate, apical appendage. **Style** linear, becoming terete and pubescent above; branches medium to long, sweeping hairs small. **Cypselas** somewhat compressed, elliptic or oblong, ribbed, smooth or rugulose. **Pappus** in many rows, always dimorphic, of fine, down-like hairs intermixed with bristles. $x = 9$ (7, 8) (aneuploids, high polyploidy).

Species ± 60, Eurasia to tropical Africa; 11 in sthn Afr., widespread.

Sphaeranthus L. 8955000

(Plucheeae)

Linnaeus: 927 (1753); Harvey: 115 (1865); Ross-Craig: 1 (1954); Merxmüller: 174 (1967a); Hilliard: 120 (1977); Anderberg: 169 (1991c); Anderberg: 302 (1994).

Annual or rarely perennial herbs or suffruticose plants, aromatic. **Leaves** alternate, dentate, usually decurrent, narrow, hairy. **Capitula** disciform, small, congested in dense, globose or ovoid to broadly cylindrical, terminal secondary heads, pedunculate, occasionally sessile; flowers reddish or purple. **Involucre** ovoid or campanulate; bracts few. **Receptacle** flat, epaleate. **Marginal florets** female; corolla filiform, 3-dentate. **Disc florets** functionally male; corolla tubular, 4- or 5-lobed. **Anthers** calcarate and caudate; cells of filament collar

flattened; endothecial tissue radial. **Style** undivided, with obtuse sweeping hairs distally. **Cypselas** oblong, reduced, often hairy with uncinate or anchor-shaped hairs. **Pappus** 0. $x = 10$ (12, 13) (aneuploids, polyploidy, B-chromosomes).

Species ± 40, mostly Africa to India and Java; 7 in sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

*Sphagneticola O.Hoffm. 9192010

(Heliantheae)

Hoffmann: 36 (1900); Karis & Ryding: 599 (1994); Pruski: 411 (1996).

Thelechitonia Cuatrec.: 242 (1954). *Complya* Strother: 10 (1991).

Perennial herbs with stems erect to prostrate, often rooting at nodes. **Leaves** opposite or uppermost occasionally alternate, elliptic or oblong-obovate to obovate, entire, weakly lobed or 3-lobed, sometimes serrate-dentate. **Capitula** radiate, terminal or axillary, solitary, on long peduncles. **Involucre** campanulate; bracts in 2 or 3 rows, outer herbaceous, inner scarious. **Receptacle** flat to convex, scaly. **Ray florets** female, fertile; corolla yellow to orange-yellow. **Disc florets** bisexual, fertile; corolla yellow to orange-yellow. **Cypselas** irregularly warted, minutely puberulous in upper part, with short early-caducous aristae. **Pappus** cup-shaped and of 1 or 2 awns, or 0.

Species 4, tropical America; **Sphagneticola trilobata* (L.) Pruski, often cultivated as ground cover, is now spreading into the natural vegetation in KwaZulu-Natal.

Spilanthes Jacq. 9207000

(Heliantheae)

Jacquin: 8 (1760); Harvey: 133 (1865); Phillips: 817 (1951); Wild: 60 (1967); Hilliard: 313 (1977); Karis & Ryding: 587 (1994).

Annual, rarely perennial herbs, often prostrate and rooting at nodes, often in damp places. **Leaves** opposite, simple, ovate to linear, entire or sinuate, glabrous. **Capitula** radiate, many-flowered, usually on long peduncles, terminal or axillary. **Involucre** campanulate; bracts in 2 or 3 rows, outer membranous, shorter than receptacle. **Receptacle** convex, sometimes elongated, paleate; paleae boat-shaped, enclosing florets. **Ray florets** female, fertile; corolla yellow or white, strap-shaped; tube ± hairy, with elliptic, usually 2-lobed lamina somewhat longer than tube. **Disc florets** bisexual, fertile; corolla yellow, tubular below, expanded above, 4- or 5-toothed. **Anthers** with small, obtuse apical appendage, base obtuse or minutely sagittate. **Style** branches of ray florets linear, of disc florets oblong, truncate, minutely penicillate. **Cypselas** elliptic or obovate, 3- or 4-angled, ± compressed, margins hyaline or ciliate. **Pappus** 0 or of 2 or 3 bristles. $x = 13$ (6, 7, 9) (aneuploids, polyploidy).

Species 6, pantropical; 2 in sthn Afr.: **Spilanthes decumbens* (Sm.) A.H.Moore, an introduced weed, known from KwaZulu-Natal and Eastern Cape, and *S. mauritiana* (Pers.) DC., indigenous in the Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Steirodiscus Less. 9421010

(Senecioneae)

Lessing: 251 (1832); Bremer: 509 (1994).

Gamolepis Less.: 251 (1832); Phillips: 836 (1951). *Psilothonna* E.Mey. ex DC.: 40 (1838a); Phillips: 16 (1950).

Annual herbs, small, glabrous. **Leaves** alternate, linear, entire or pinnatisect, with linear lobes. **Capitula** radiate, pedunculate, many- or few-flowered, in lax corymbs or solitary. **Involucre** ecalyculate, campanulate, ovoid or subglobose; bracts ± connate. **Receptacle** convex to conical, epaleate. **Ray florets** female; corolla yellow; tube with ± oblong, obtuse or 3-toothed lamina 2–4 times as long as tube. **Disc florets** bisexual, fertile or functionally male; corolla yellow; tube becoming campanulate above, with 5 ovate or lanceolate lobes. **Anthers** ecalcarate and ecaudate; with linear or lanceolate, apical appendage; endothecial tissue radial. **Style** terete, with linear, truncate, penicillate branches. **Cypselas** obovoid or oblong, glabrous or sparsely pubescent. **Pappus** 0.

Species 6, endemic to sthn Afr., Northern and Western Cape.

Stilpnogyne DC. 9385000

(Senecioneae)

Candolle: 293 (1838a); Harvey: 306 (1865); Bremer: 509 (1994).

Annual herbs, delicate, glabrous. **Leaves** alternate, petiolate, ovate-cordate, dentate, auriculate. **Capitula** disciform, small, few-flowered, solitary or corymbose, pedunculate. **Involucre** ecalyculate, campanulate; bracts in 1 row, linear-lanceolate, with submembranous margins, basally connate, glabrous. **Receptacle** flat, epaleate. **Marginal florets** female; corolla 3-toothed. **Disc florets** bisexual, fertile; corolla yellowish; tube widened above, glabrous, with 5 lanceolate lobes. **Anthers** linear, ecalcarate and ecaudate; with lanceolate, apical appendage; endothecial tissue radial. **Style** terete in female florets, with downy, terete branches; in disc florets branches shorter and bearded at apex only. **Cypselas** compressed, obovate, sparsely pubescent. **Pappus** of many fine bristles; 0 in marginal florets.

Monotypic, endemic to sthn Afr.: *Stilpnogyne bellidioides* DC., Western Cape.

Stoebe L. 9037000

(Gnaphalieae)

Linnaeus: 831 (1753); Harvey: 279 (1865); Levyns: 1 (1937); Anderberg: 77 (1991a); Anderberg: 334 (1994).

Eremanthis Cass.: 64 (1827). *Perotriche* Cass.: 75 (1818). *Seriphium* Less.: 346 (1832).

Single or multi-stemmed, robust or weak shrubs or dwarf shrubs, up to 1.5 m tall, occasionally prostrate; branches densely or sparsely leafy, tomentose or glaucous. **Leaves** small, alternate, often ericoid and twisted, broadly cymbiform, linear or narrowly triangular, adaxial surface villous or tomentose, abaxial surface glabrous or covered in a matted layer of hairs, tips rounded mucronate or pungent, margins slightly or strongly involute. **Synflorescences** tight, globose or cylindrical, terminal heads, or an open or dense plumose arrangement of capitula. **Capitula** discoid, 1-flowered. **Involucral bracts** in a few rows, innermost dry and membranous, outermost shorter, often leafy. **Receptacle** stalk-like, epaleate. **Ray florets** 0. **Disc florets** bisexual, tubular, white, pink or wine-red, 5-lobed; lobes erect or spreading. **Anthers** apically acuminate, basally tailed. **Style** bifid, branches truncate, pencilled at tips. **Nectary** a small disk between style and cypsela or 0. **Cypselas** small, with or without a rim-like annulus, smooth or tomentose, trichomes short with tips rounded or longer, more flexible with tips acuminate. **Pappus** of 10–26 capillary bristles, plumose in upper part, fused in a ring at base, rarely free, 0 in *Stoebe montana* and *S. schultzii*. $x = 8$ (1 report).

Species 25, tropical and sthn Afr. and Madagascar; 20 in Northern, Western and Eastern Cape, *Stoebe plumosa* (L.) Thunb. widespread northwards to Namibia and Zimbabwe.

Stomatanthes R.M.King & H.Rob. 8816010

(Eupatorieae)

King & Robinson: 430 (1970); Bremer *et al.*: 664 (1994).

Perennial herbs or subshrubs. **Leaves** alternate, rarely subopposite; petioles short. **Capitula** discoid; 4 or 5 florets present in capitulum, in panicles or corymbs. **Involucre** with bracts in few rows, unequal to equal. **Receptacle** glabrous. **Corolla** white, funnel-shaped or tubular, sometimes glandular. **Anthers**: filaments thick. **Style**: branches densely hirsute, apex papillate. **Cypselas** 5- to 8-ribbed, usually setose and sometimes glandular; carpopodium generally conspicuous. **Pappus** of many scabrid bristles. $x = 10$ (1 report).

Species 15, Brazil, Uruguay, tropical Africa; 1 in sthn Afr.: *Stomatanthes africanus* (Oliv. & Hiern) R.M.King & H.Rob., North-West, Northern Province, Gauteng, Mpumalanga and Swaziland.

Syncarpha DC. 9000010

(Gnaphalieae)

Candolle: 205 (1810); Nordenstam: 2 (1989); Anderberg: 150 (1991a); Anderberg: 363 (1994).

Helipterum DC.: 211 (1838a) of other authors in part, name illegitimate; Harvey: 256 (1865).

Perennial herbs. **Leaves** alternate, sessile, tomentose to velutinous (hair type B), margins flat or slightly concave, entire. **Capitula** discoid, solitary or few together. **Involucre** campanulate or ellipsoid; involucral bracts in ± 9 rows, small to large, outer usually oblong, with glumaceous appendage, sometimes with reflexed, acuminate, scarious apex and often woolly on back; inner bracts with glumaceous, usually coloured appendage (yellow, pink, white or brown), opaque; stereome divided or undivided. **Receptacle** epaleate, but with prominent fimbrils. **Florets** bisexual; corolla yellow; tube broadened above, usually with scattered glands and with 5 linear to lanceolate lobes. **Anthers** ecalcarate, caudate; apical appendage concave, as wide as thecae; endothecial tissue polarised. **Style** bifid; style branches truncate with obtuse sweeping hairs apically. **Cypselas** oblong, with globose, myxogenic hairs, epidermis smooth. **Pappus** of basally connate, generally plumose bristles.

Species 25; endemic to sthn Afr., Western and Eastern Cape.

*Tagetes L. 9311000

(Helenieae)

Linnaeus: 887 (1753); Linnaeus: 378 (1754); Phillips: 820 (1951); Pope: 115 (1975); Hilliard: 328 (1977); Karis & Ryding: 547 (1994).

Annual herbs, usually erect, glabrous, strongly aromatic. **Stems** simple or diffusely branched. **Leaves** opposite or alternate, sessile, base expanded with several, narrow, linear segments, pinnate or rarely simple, lobes lanceolate to narrowly elliptic, margins sharply serrate. **Capitula** usually radiate, few-flowered, solitary on long peduncles or corymbosely arranged. **Involucre** cylindric; bracts usually in 1 row, outer ones minute, inner ones connate. **Receptacle** flat, epaleate. **Ray florets** female, fertile; corolla pale yellow to lemon-yellow, strap-shaped. **Style** branches linear-lanceolate. **Disc florets** bisexual, fertile; corolla yellow, tubular, expanded above, 5-fid. **Anthers** with bases obtuse; apical appendage lanceolate. **Style** branches narrowly oblong, truncate and penicillate or with deltoid appendage, papillose on outer faces. **Cypselas** linear, narrowed to base, compressed or angled. **Pappus** of few scales, sometimes awned. $x = 6$ (10, 11) (high polyploidy).

Species ± 50, North and South America; **Tagetes minuta* L., widespread weed throughout sthn Afr.

*Tanacetum L. 9341070

(Anthemideae)

Linnaeus: 1028 (1753); Heywood: 169 (1976); Bremer & Humphries: 100 (1993); Bremer: 454 (1994).

Perennial herbs. **Leaves** alternate, petiolate, pinnatifid to pinnatisect, glandular-punctate, densely silvery-sericeous. **Capitula** radiate, solitary. **Involucral bracts** in 3 rows, sometimes with dark brown margins. **Receptacle** flat or convex, epaleate. **Ray florets** female or neuter; lamina white. **Disc florets** bisexual, with yellow corolla, 5-lobed. **Anthers** ecalcarate and ecaudate. **Cypselas** oblong, 5–7-ribbed, often with sessile glands. **Pappus** an irregularly lobed corona. $x = 9$ (7, 8) (aneuploids, polyploidy, B-chromosomes).

Species ± 152, Europe, Asia and North Africa; 1 in sthn Afr.: **Tanacetum cinerariifolium* (Trevir.) Sch.Bip., widely cultivated.

*Taraxacum F.H.Wigg. 9592000

(Lactuceae)

Wiggers: 56 (1780); Harvey: 526 (1865); Hilliard: 608 (1977); Pope: 212 (1992); Bremer: 182 (1994).

Perennial herbs, acaulescent, scapigerous, with milky latex, with simple or branched taproots. **Leaves** rosulate, entire, sinuate, mostly runcinate-dentate to pinnatifid-pinnatisect. **Scapes** 1–many, simple, hollow. **Capitula** ligulate, solitary, terminal. **Involucre** campanulate or oblong; bracts in 2 rows, inner row erect, outer row shorter and spreading or recurved. **Receptacle** flat, epaleate, pitted. **Florets** bisexual, fertile; corolla yellow, rarely white, strap-shaped. **Anthers** sagittate at base; auricles shortly setaceous-acuminate. **Style** with branches long, slender; sweeping hairs long. **Cypselas** obovoid-fusiform, ribbed apically scabrid to transversely muricate, with distinct, long, slender beak. **Pappus** of many, long, unequal, scabrid-barbellate bristles. $x = 6$, 8 (4, 5, 7, 9, 10, 13, 17) (aneuploids, high polyploidy, B-chromosomes).

Species 60, north temperate regions and temperate South America; 15 in sthn Afr., not known from Namibia and Botswana.

Tarchonanthus L. 8937000

(Tarchonantheae)

Linnaeus: 842 (1753); Harvey: 117 (1865); Paiva: 355 (1972); Hilliard: 110 (1977); Pope: 9 (1992); Bremer: 105 (1994).

Trees or shrubs, dioecious, often aromatic. **Leaves** alternate, petiolate or subsessile, persistently tomentose or lanate beneath, entire to coarsely irregularly serrate or 3-lobed towards apex. **Synflorescences** in terminal or axillary panicles, the whole usually tomentose-lanate. **Capitula** discoid; florets yellowish. **Involucre** subcylindric, broadly campanulate or subglobose; bracts in 1 or 2 rows. **Receptacle** flat or somewhat convex, honeycombed, epaleate, usually with long, silky hairs. **Male capitula** with corolla tubular or funnel-shaped, villous or lanate outside, lobes 5, recurved; anthers calcarate and caudate, apical appendage long, flat; endothecial tissue polarised; style narrowly terete, simple or minutely bifid; ovary abortive; pappus 0. **Female capitula** with corolla shorter than ovary, villous or lanate outside, 4- or 5-lobed; style branches short, flat, ovate; cypselas ± flattened, obovoid or ellipsoid, densely lanate; pappus 0.

Species 2, Africa; 2 in sthn Afr.: *Tarchonanthus camphoratus* L. and *T. trilobus* DC., widespread.

Tenrhynea Hilliard & B.L.Burtt 8994000

(Gnaphalieae)

Hilliard & Burtt: 232 (1981); Hilliard: 57 (1983); Anderberg: 140 (1991a); Anderberg: 363 (1994).

Rhynea DC.: 154 (1838a), not of Scop.; Harvey: 204 (1865); Hilliard: 134 (1977); Hilliard & Burtt: 374 (1973); Hilliard & Burtt: 196 (1981).

Shrubby perennial; branches closely leafy. **Leaves** alternate, lanceolate, margins entire, sessile, bases decurrent in long narrow wings, green above drying grey, with thin skin-like indumentum, white-tomentose below (hair type B). **Capitula** disciform, cylindric, in small terminal clusters, often further aggregated into spreading corymbose panicle. **Involucral bracts** in several rows, imbricate, graded, inner ones with stereome undivided, tips shortly exceeding flowers, radiating, opaque milk-white or occasionally pink. **Receptacle** flat, paleate; paleae resembling inner involucral bracts. **Florets** 17–26, 3–11 female, corolla purple, narrowly tubular or filiform; 10–17 bisexual, outnumbering female flowers, corolla purple, tubular below, campanulate above, 5-lobed, all lobes with glandular hairs on backs. **Anthers** ecalcarate, caudate, tails shorter or longer than filament collar; with lanceolate apical appendage; endothecial tissue polarised. **Style** branches with slightly rounded tips, with short, obtuse, sweeping hairs extending briefly down backs. **Cypselas** oblong, with elongate duplex hairs with basal swelling cushion, myxogenic. **Pappus** bristles scabrid above, cilia ± fused, shaft scabridulous, base nude, not cohering, caducous.

Monotypic, endemic to sthn Afr.: *Tenrhynea phylicifolia* (DC.) Hilliard & B.L.Burtt, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Thaminophyllum Harv. 9338000

(Anthemideae)

Harvey: 155 (1865); Bond: 158 (1980); Bremer & Humphries: 146 (1993); Bremer: 471 (1994).

Shrublets with silky pubescence. **Leaves** alternate, entire, ericoid, sessile, aromatic. **Capitula** radiate, solitary or in leafy cymes towards ends of branches, 7–12-flowered. **Involucre** campanulate or ovoid; bracts in 2 or 3 rows, ciliate or fimbriate, pilose on back. **Receptacle** epaleate, pubescent or pilose, convex or conical. **Ray florets** 2–11, female, sterile, strap-shaped, white or pink; with cylindric tube and elliptic or obovate lamina, 2–3 times as long as tube. **Style** undivided. **Disc florets** bisexual, fertile, yellow; tube somewhat compressed, glandular, with 4 acute or rounded lobes. **Anthers** ecalcarate and ecaudate; with oblong, apical appendage. **Style** branches linear, truncate, bristle-tipped; stylopodium large and persistent in fruit. **Cypselas** oblong, 3- or 4-angled, glabrous, with large myxogenic cells in rounded, scattered groups; crowned with hardened conical or globose stylopodium. **Pappus** 0. $x = 10$.

Species 3, endemic to sthn Afr., Western Cape.

*__Tithonia__ Desf. ex Juss. 9196000

(Heliantheae)

Jussieu: 189 (1789); Phillips: 816 (1951); Wild: 55 (1967); Hilliard: 307 (1977); La Duke: 478 (1982); Karis & Ryding: 605 (1994).

Annual herbs. **Leaves** usually alternate, simple, entire or often deeply lobed. **Capitula** radiate, solitary or few together; on long peduncles, thickened towards apex. **Involucre** hemispherical or broadly campanulate; bracts in 2–5 rows. **Receptacle** convex, paleate; paleae rigid, usually lobed, acuminate to aristate, embracing disc florets. **Ray florets** neuter; corolla yellow or orange, strap-shaped; tube somewhat compressed, linear-oblong, much shorter than lamina; lamina long-lanceolate, minutely 2- or 3-lobed. **Disc florets** bisexual, fertile; corolla yellow, slender, 5-toothed. **Anthers** linear, obtuse or very shortly sagittate, with lanceolate appendages. **Style** terete, globose at base; branches narrowly oblong, gradually widening upward to acutely triangular tips, pubescent on outer faces. **Cypselas** linear-obovate, usually 4-angled. **Pappus** of connate scales, sometimes with 1 or 2 awns. $x = 17$ (5, 8, 11) (aneuploids, polyploidy, B-chromosomes).

Species 11, SW United States to Costa Rica; 2 in sthn Afr.: **Tithonia diversifolia* (Hemsl.) A.Gray, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, and **T. rotundifolia* (Mill.) Blake, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland and KwaZulu-Natal, introduced from America, now naturalised.

Tolpis Adans. 9561000

(Lactuceae)

Adanson: 112 (1763); Phillips: 852 (1951); Hilliard: 598 (1977); Bremer: 196 (1994).

Annual or perennial herbs, usually scapigerous, ± pubescent, with milky latex. **Leaves** radical or cauline and alternate, entire, dentate or pinnatifid. **Capitula** ligulate, many-flowered, in lax corymbose panicles, peduncles hollow. **Involucre** campanulate; with unequal bracts in 2 or 3 rows. **Receptacle** flat, epaleate, alveolate. **Florets** (ligules) bisexual, fertile; corolla strap-shaped, yellow or innermost purplish brown, pubescent outside, with tube and 5-toothed lamina. **Anthers** with base sagittate; apical appendages ovate. **Style** linear, setose above, with linear obtuse branches, sweeping hairs short. **Cypselas** obconic, closely ribbed, smooth, glabrous. **Pappus** in 2 rows, with setose bristles, persistent. $x = 9$.

Species 20, Macaronesia, Mediterranean region, northern and tropical Africa; 1 in sthn Afr.: *Tolpis capensis* (L.) Sch.Bip., widespread in South Africa and Swaziland.

*__Tragopogon__ L. 9579000

(Lactuceae)

Linnaeus: 789 (1753); Linnaeus: 346 (1754); Phillips: 853 (1951); Henderson & Anderson: 406 (1966); Hilliard: 606 (1977); Bremer: 201 (1994).

Biennial or perennial herbs with milky latex. **Leaves** alternate, amplexicaul, entire, grass-like, glabrous. **Capitula** ligulate; solitary, terminal, long-peduncled. **Involucre** cylindric or narrowly campanulate; bracts in 1 row, lanceolate-acuminate, basally somewhat connate. **Receptacle** slightly convex, shallowly honeycombed, epaleate. **Florets** (ligules) bisexual, fertile; corolla yellow, blue or purple, strap-shaped, tube linear, slightly shorter than lamina, pilose at junction of lamina and tube; lamina broadly linear, truncate, 5-toothed. **Anthers** with base sagittate, auricles acute or shortly setaceous-acuminate. **Style** linear, becoming terete above, glandular-pubescent on cylindric portion; branches filiform, glandular. **Cypselas** fusiform, with slender beak, strongly ribbed; ribs tuberculate, pilose at apex, otherwise glabrous. **Pappus** of many plumose and intertwined bristles, often scabrid-barbellate apically. $x = 6$ (7) (polyploidy, B-chromosomes).

Species 50, temperate Eurasia, Mediterranean region; 3 occur as weeds of cultivation, not known from Namibia and Botswana.

Trichogyne Less. 8967010

(Gnaphalieae)

Lessing: 231 (1831); Anderberg: 155 (1991a); Anderberg: 364 (1994).

Ifloga Cass. in part, Hilliard: 297 (1981b). *Petalactella* N.E.Br.: 100 (1894).

Ericoid perennial herbs, shrublets or shrubs, rarely annuals. **Leaves** alternate, sessile, often adaxially concave,

tomentose on adaxial surface only (hair type B), eglandular, margins involute, entire. **Capitula** disciform, few together along axis. **Involucral bracts** papery, brownish, transparent; at least inner bracts ± hairy on abaxial surface; stereome divided. **Receptacle** flat, epaleate. **Marginal florets** female, purple, filiform, more numerous than disc florets. **Disc florets** functionally male; corolla yellow, cylindric below, campanulate above, lobes erect. **Anthers** ecalcarate, with short tails; apical appendage flat, as wide as thecae; endothecial tissue polarised. **Style** undivided, with obtuse sweeping hairs distally. **Cypselas** small, oblong, glabrous or with short, clavate, nonmyxogenic twin hairs; epidermis smooth. **Pappus** of free, apically plumose, capillary bristles in 1 row, basally without patent cilia.

Species 9, endemic to sthn Afr., Namibia, Northern, Western and Eastern Cape, 1 extending to Free State and S Mpumalanga.

*Tridax L. 9245000

(Heliantheae)

Linnaeus: 900 (1753); Linnaeus: 382 (1754); Wild: 10 (1967); Hilliard: 321 (1977); Karis & Ryding: 609 (1994).

Annual or perennial herbs, usually hairy, prostrate or ascending. **Leaves** opposite, petiolate, toothed or pinnately cut with segments few, narrow. **Capitula** radiate; on long peduncles, solitary. **Involucre** campanulate; bracts in 2 or 3 rows. **Receptacle** flat or convex, paleate; paleae membranous, keeled but scarcely clasping disc florets, persistent. **Ray florets** female, fertile; corolla yellow or creamy, strap-shaped. **Disc florets** bisexual, fertile; corolla yellow or greenish, cylindric, 5-lobed or 5-toothed. **Anthers** with bases sagittate; apical appendages narrowly deltoid. **Style** branches of ray florets shortly linear-lanceolate; of disc florets much longer, acuminate with subulate appendage, hairy on outer faces. **Cypselas** obconical, villous. **Pappus** of many plumose bristles. $x = 9$ (3, 10) (polyploidy).

Species 30, Central and South America; **Tridax procumbens* L., a pantropical weed, is occasionally found in the Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Tripteris Less. 9428000

(Calenduleae)

Lessing: 95 (1831); Nordenstam: 376 (1994).

Osteospermum subgen. *Tripteris* (Less.) Norl.: 263 (1943); Norlindh: 393 (1960).

Annual or perennial herbs, subshrubs or shrubs. **Leaves** alternate or opposite, petiolate to sessile, entire or variously lobed, sometimes with auricles. **Capitula** radiate, corymbose or solitary. **Involucre** campanulate or turbinate; bracts imbricate or almost in 2 rows, seldom subequal and nearly in 1 row. **Ray florets** female, fertile; corolla yellow to orange. **Cypselas** 3-winged, with apical fenestrate airchamber, usually homomorphic, sometimes dimorphic with some wingless and rostrate. **Disc florets** functionally male. **Anthers** ecalcarate, caudate; endothecial tissue polarised. **Style** bifid with apical ring of hairs. **Pappus** 0. $x = 8$.

Species ± 22, south and tropical Africa north to Egypt, Arabian Peninsula and Jordan; 20 in sthn Afr., widespread but absent from Swaziland and KwaZulu-Natal.

Troglophyton Hilliard & B.L.Burtt 8992020

(Gnaphalieae)

Hilliard & Burtt: 208 (1981); Hilliard: 39 (1983); Anderberg: 168 (1991a); Anderberg: 364 (1994).

Delicate annual or short-lived perennial herbs well-branched from base; stems filiform, prostrate, diffuse or weakly erect, thinly white-woolly, distantly leafy. **Leaves** alternate, small, on filiform petioles; blade elliptic or ovate; margins flat, entire, both surfaces cobwebby or thinly woolly (hair type B), upper sometimes glabrescent. **Capitula** discoid or disciform, small, on filiform peduncles racemosely or subcorymbosely arranged, or rarely nearly sessile and crowded. **Involucral bracts** in 3(–5) rows, subequal, slightly exceeding flowers; stereome undivided or with 2 or 3 thin linear patches in upper part, lower part canaliculate, embracing adjacent flower; lamina delicate, pellucid, sometimes purplish above stereome, tip subopaque or opaque white, obtuse to subacute, either radiating or whole involucre rotating at maturity. **Receptacle** shallowly tubercled, flat, epaleate. **Flowers** 8–30, yellow, sometimes tipped pink; female flowers (0)2–23, fewer than, or ± equalling, or 2 or 3(–7) × as many as bisexual florets, narrowly tubular or filiform; bisexual flowers narrowly infundibuliform or tubular below, narrowly campanulate above, with 5 deltoid lobes, glandular hairs with biseriate stalk and small globular 2-celled head on backs of all lobes. **Anthers** ecalcarate, caudate, tails shorter than, ± equalling, or slightly exceeding filament collar, with small obtuse apical appendage; endothecial tissue polarised. **Style** branches truncate and penicillate, with obtuse sweeping hairs apically. **Cypselas** oblong, wall with slightly raised cells, moderately imbricate or not, oblong duplex hairs with swelling cushion frequently present, apparently not always emitting mucilage (neither imbricate cells nor duplex hairs a specific character). **Pappus** bristles barbellate or subplumose above, these cilia ± clavate and with delicate wall thickenings, shaft markedly barbellate, bases cohering by patent cilia.

Species 6, endemic to sthn Afr., Namibia, Free State, KwaZulu-Natal, Northern, Western and Eastern Cape.

*Urospermum Scop. 9573000

(Lactuceae)

Scopoli: 122 (1777); Phillips: 852 (1951); Hilliard: 603 (1977); Bremer: 199 (1994).

Annual or perennial, acaulescent or with distinct stem, with milky latex. **Stems** with scattered, setose hairs. **Leaves** rosulate or alternate along branched stems, entire, lyrate or toothed, setose. **Capitula** ligulate, many-flowered, solitary, terminal at ends of long peduncles. **Involucre** campanulate; bracts in 1 row, connate at base, elliptic-lanceolate, with long papillae on back. **Receptacle** flat, epaleate. **Florets** (ligules) bisexual, fertile; corolla pale yellow, strap-shaped; tube cylindric, longer than lamina with copious hairs at junction of lamina and tube; lamina broadly linear, truncate, 5-toothed. **Anthers** linear, sagittate, with ovate appendage. **Style** linear, terete above, pubescent on terete portion; branches long, obtuse, with very short pollen-sweeping hairs. **Cypselas** linear-oblong, subterete, usually curved, ribbed, beaked; beak basally swollen into bulbous, hollow part crowning the flattened, embryo-containing part of cypsela. **Pappus** of plumose, basally widened bristles. $x = 5, 7$ (4—1 report) (high polyploidy—1 report).

Species 2, Mediterranean region; **Urospermum picroides* (L.) Scop. ex F.W.Schmidt, a weed in S KwaZulu-Natal, Western and Eastern Cape.

Ursinia Gaertn. 9431000

(Anthemideae)

Gaertner: 462, t. 174 (1791); Harvey: 150 (1865); Prassler: 363 (1967); Bremer & Humphries: 93 (1993); Bremer: 451 (1994).

Sphenogyne R.Br.: 142 (1813); Harvey: 137 (1865). *Ursiniopsis* E.Phillips: 841 (1951).

Annual or perennial herbs or subshrubs. **Leaves** alternate, entire or serrate to pinnatisect. **Capitula** radiate,

rarely discoid, many-flowered, pedunculate, solitary or laxly corymbose. **Involucre** campanulate; bracts in 5–7 rows, free; outer usually with brown margin; inner or all with membranous margin, glabrous. **Receptacle** flat or convex, honeycombed, paleate; paleae as long as and enveloping disc florets, sometimes narrow with apical limb. **Ray florets** neuter, rarely female, fertile or sterile; corolla yellow, orange, white or rarely reddish, dorsally sometimes coppery; tube with ± linear-oblong, rounded or 2- or 3-toothed lamina 2.5–10 × longer than tube. **Disc florets** bisexual, fertile, central florets female and sterile; corolla yellow, purplish or coppery; tube cylindric or funnel-shaped, with 5 lanceolate, sometimes appendaged lobes, sometimes with marginal glands. **Anthers** ecalcarate and ecaudate; with ovate, apical appendage; endothecial tissue polarised. **Style** terete, with linear, penicillate branches, papillose at apex. **Cypselas** 5-ribbed, glabrous or with basal tuft of long hairs, glandular, erect or curved. **Pappus** in 1 row, of 5–10 obovate or rounded, hyaline, sometimes fimbriate scales, which envelop one another; or in 2 rows, of 5 outer scales and 5 inner bristles; occasionally 0. $x = 8$ (5, 7).

Species ± 39, sthn Afr. and Ethiopia; widespread but mostly Northern Cape (Namaqualand), Western and Eastern Cape.

Vellereophyton Hilliard & B.L.Burtt 8992010

(Gnaphalieae)

Hilliard & Burtt: 210 (1981); Hilliard: 31 (1983); Anderberg: 168 (1991a); Anderberg: 364 (1994).

Grey- or white-woolly annual or perennial herbs; stems few to many from crown, prostrate, ascending or erect, simple or branched, leafy. **Leaves** alternate, small to medium-sized, oblanceolate or spathulate, apex subacute or obtuse, base much narrowed, petiole-like, margins flat, entire, both surfaces thinly or thickly grey- or white-woolly (hair type B), eglandular. **Capitula** disciform, or discoid in 1 species, very small, few or many in woolly glomerules subcorymbosely arranged at branchlet tips. **Involucral bracts** in (2)3–5 rows, backs woolly, inner bracts subequal, ± equalling or exceeding flowers; stereome divided in upper half, lower part concave, embracing adjacent flower, lamina thin, pellucid, sometimes purplish above stereome, tip opaque white, obtuse or rounded, radiating. **Receptacle** nearly smooth, epaleate. **Florets** 10–40, yellow, often tipped red; female flowers (0)1–30, either fewer than, ± equalling, or up to 10 times as many as bisexual florets, narrowly tubular or filiform; bisexual florets tubular, scarcely widened above with 5 deltoid lobes markedly mamillate on outer surface except in 1 species, glandular hairs with biseriate stalk and small 2-celled globular head on backs of all lobes. **Anthers** ecalcarate, caudate, tails ± equalling or exceeding filament collar; with small obtuse apical appendage; endothecial tissue polarised. **Style** branches truncate and penicillate, with obtuse sweeping hairs. **Cypselas** oblong, wall smooth or nearly so or cells imbricate, oblong duplex hairs with swelling cushion frequently present, often myxogenic. **Pappus** bristles subplumose in upper part with clavate hairs, delicate patent cilia at base, cohering or not.

Species 7, endemic to sthn Afr., Northern, Western and Eastern Cape. One species naturalised in Australia and New Zealand.

*__Verbesina__ L. 9218000

(Heliantheae)

Linnaeus: 901(1753); Phillips: 817 (1951); Wild: 61 (1967); Karis & Ryding: 599 (1994).

Annual herbs, with ribbed and pilose branches. **Leaves** alternate, ovate, deeply toothed, pubescent on upper surface, densely albo-tomentose beneath. **Capitula** radiate; many-flowered, peduncled, terminal and axillary, corymbose. **Involucre** campanulate; bracts in 2 rows, lanceolate, strigose on back, herbaceous. **Receptacle** flat, paleate; paleae as long as ovary, lanceolate in profile, boat-shaped, acuminate, keeled, ciliate on keel, pilose above. **Ray florets** sterile or rarely neuter; corolla yellow; tube very much shorter than lamina, pilose; lamina broadly linear, obtuse. **Disc florets** bisexual, fertile; corolla yellow; tube pilose below, widened above; lobes 5, ovate, glandular on face. **Anthers** linear, faintly eared at base, with lanceolate apical appendage. **Style** terete, globose at base; branches linear, contracted at apex into linear, glandular appendage. **Cypselas** oblong, obovate or triquetrous, laterally compressed. **Pappus** of 2 awns. $x = 17$ (7, 8, 9, 10) (aneuploids, polyploidy, B-chromosomes).

Species ± 300, North, Central and South America; 2 occur in various parts of sthn Afr. as introduced weeds: **Verbesina encelioides* (Cav.) Benth. & Hook. var. *encelioides*, Namibia, Botswana, North-West, Northern Province, Free State, Northern Cape, and **V. encelioides* (Cav.) Benth. & Hook. var. *exauriculata* C.B.Rob. & Greenm., Eastern Cape.

Vernonia Schreb. 8751000

(Vernonieae)

Schreber: 541 (1791); Harvey: 48 (1865); Hilliard: 25 (1977); Pope: 57 (1992); Bremer: 227 (1994).

Annual or perennial herbs, often suffrutescent with annual stems from woody rootstocks, or small to large shrubs, woody scramblers or rarely small trees. **Leaves** alternate, rarely opposite, sometimes radical, sessile or petiolate, linear to ovate, entire or lobed, penninerved, often glandular. **Capitula** discoid, 1–many-flowered, capitula usually arranged in corymbiform cymes, sometimes scorpioidly cymose, or in various axillary or terminal clusters, spicate, paniculate or solitary and terminal. **Involucre** cyathiform-campanulate, obconic, cylindric or hemispheric; bracts free, in 2–many rows, loosely or appressed imbricate; apices acute, obtuse or rounded, often mucronate or aristate. **Receptacle** flat or convex, plane or alveolate; alveolae sometimes fimbriate; epaleate. **Florets** normally bisexual and fertile; corolla creamy white, various shades of purple or blue; cylindric to narrowly infundibuliform or slender-tubular below and abruptly widened cylindric above; regularly 5-lobed. **Anthers** calcarate, ecaudate or shortly caudate; with linear or lanceolate apical appendage. **Style** branches long-tapering-subterete with stigmatic papillae on inner surface towards base, pilose or shortly hirsute outside, usually with sweeping hairs. **Cypselas** subterete to ± laterally compressed, obpyramidal and 4- or 5-sided, oblong-obovoid, turbinate or subfusiform, 2–20-ribbed, sometimes smooth, sparsely to densely glandular, variously hairy or glabrous, with or without distinct basal callus. **Pappus** usually in 2 rows with outer row of short scales or setae, sometimes caducous; inner whorl of long, barbellate or subplumose, sometimes caducous, whitish purple or green setae, more rarely outer pappus 0. $x = 9, 10, 17$ (8, 11, 12, 19) (aneuploids, polyploidy, B-chromosomes).

Species over 1000, fairly cosmopolitan; 40 in sthn Afr., widespread but absent from Western Cape.

*__Xanthium__ L. 9148000

(Heliantheae)

Linnaeus: 987 (1753); Linnaeus: 424 (1754); Oliver & Hiern: 371 (1877); Phillips: 813 (1951); Wild: 3 (1967); Hilliard: 297 (1977); Henderson *et al.*: 110 (1987); Karis & Ryding 623 (1994).

Coarse, annual herbs, monoecious. **Leaves** alternate, petiolate, simple, deltoid or narrowly rhomboidal, mar-

gin variously toothed or lobed. **Capitula** and **florets** unisexual. **Male capitula** globose, many-flowered; involucre short, bracts few, narrow, in 1 or 2 rows; receptacle hemispherical, paleate; corolla tubular, 5-toothed; anthers with small apical appendage, base obtuse; filaments connate; ovary abortive; style undivided. **Female capitula** ovoid, 2-flowered; involucre completely enveloping 2 female flowers, 2-locular within, apex 1- or 2-beaked; corolla 0; style branches long, linear, acute, tips exserted on inner face of each terminal beak near its base; cypselas obovoid or oblong, solitary in each involucral chamber; involucre enlarging, hardening, with prominent hooked spines, shed as 2-celled unit. **Pappus** 0. $x = 9$ (5, 17) (high polyploidy—1 report).

Species 3, widespread weeds in warm parts of the world; 2 in sthn Afr., both from tropical America: **Xanthium spinosum* L., widespread but absent from Namibia and Western Cape and **X. strumarium* L., troublesome weed, absent from Namibia, Botswana, Northern Province and Northern Cape.

*Youngia Cass. 9605010

(Lactuceae)

Cassini: 88 (1831); Hilliard: 635 (1977); Bremer: 183 (1994).

Annual or perennial herbs with milky latex. **Leaves** radical or alternate, entire, coarsely toothed or pinnatifid. **Capitula** ligulate, corymbose or rarely racemose. **Involucre** narrowly campanulate or subcylindric; bracts in 2 unequal rows, outer few and short, inner lanceolate. **Receptacle** epaleate. **Florets** strap-shaped; corolla yellow. **Anthers** sagittate at base, acute or shortly setaceous-acuminate. **Style** branches long, slender, sweeping hairs present. **Cypselas** narrowly oblong-terete to fusiform, apically slightly attenuate, somewhat compressed, many-ribbed, usually with 5 main ribs, glabrous. **Pappus** of scabrid-barbellate bristles. $x = 5, 8$ (4, 6, 9) (polyploidy).

Species ± 30, Asia; **Youngia japonica* (L.) DC., introduced, has become a weed on the coast and in the midlands of KwaZulu-Natal.

*Zinnia L. 9155000

(Heliantheae)

Linnaeus: 1189 (1759) name conserved; Phillips: 813 (1951); Torres: 4 (1963); Wild: 54 (1967); Hilliard: 299 (1977); Karis & Ryding: 588 (1994).

Annual or perennial herbs, sometimes shrubby. **Leaves** opposite, sessile or shortly petiolate, simple, bases connate and sheathing stem, margins entire, roughly hairy. **Capitula** radiate, large, solitary, terminal on long, hollow peduncle swollen below capitulum. **Involucre** narrowly or broadly campanulate or subcylindric; bracts in 3 to many rows, oblong or obovate, imbricate, apices rounded with darker or discoloured summit band at or near apex. **Receptacle** conical to concave, with paleae conduplicate, embracing disc florets. **Ray florets** female, fertile; corolla strap-shaped, discolorous, outer surface greyish white, inner surface reddish or brownish red, drying purplish, persistent. **Cypselas** 3-angled or dorsiventrally compressed. **Pappus** 0. **Disc florets** bisexual, fertile; corolla brownish yellow, tubular, 5-toothed. **Anthers** with small apical appendage, base obtuse. **Style** branches long, linear, obtuse or subtruncate. **Cypselas** obovate, 3-angled or compressed. **Pappus** of 1 or 2 awns. $x = 10, 11, 12$ (7, 9, 13) (aneuploids, polyploidy, B-chromosomes).

Species 22, America, Peru, Mexico; 1 in sthn Afr.: **Zinnia peruviana* (L.) L., a widespread weed, absent from Western Cape.

Zyrphelis Cass. 8882010

(Astereae)

Cassini: 420 (1829b); Nesom: 91 (1994).

Elphegea subg. *Zyrphelis* (Cass.) Less.: 183 (1832). *Mairia* sect. *Zyrphelis* (Cass.) DC.: 218 (1836a). *Mairea* sect. *Zyrphelis* (Cass.) Harv.: 64 (1865). *Mairea* sect. *Homochroma* (DC.) Harv.: 64 (1865).

Subshrubs or basally lignescent herbs with vestiture of stout, thick-based, usually spreading hairs, sometimes also lightly tomentose; stems prominently branching. **Leaves** alternate, linear or spathulate, entire, almost all cauline or less commonly basally disposed. **Capitula** radiate, terminal, solitary, rarely corymbosely arranged, 3–12(–18) mm wide. **Involucral bracts** with broad, scarious margins, strongly concave. **Receptacle** epaleate. **Ray florets** female, strap-shaped, fertile; corolla white, blue or yellow. **Disc florets** functionally male, sterile (but fertile in *Z. perezioides*), tubular, 5-toothed; corolla yellow. **Cypselas** oblong-obovate, 2-nerved, strongly flattened, moderately to densely strigose-sericeous with filiform hairs or glabrous. **Pappus** of caducous, plumose bristles, in a single row.

Species 10, subtropical Africa; 9 in sthn Afr., Western Cape.

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Avicenniaceae

(Asteridae—Lamiales)

Compiled by E. Retief

Shrubs or small trees of the mangrove zone; pneumatophores present; nodes swollen. **Leaves** opposite, simple, lanceolate to elliptic, sessile, entire, coriaceous, petiolate; stipules 0. **Flowers** bisexual, regular, small, in contracted or capitate cymes; bracts and bracteoles present. **Calyx** deeply 5-lobed; lobes ovate. **Corolla** 4- or 5-lobed, somewhat fleshy, yellow; tube funnel-shaped or campanulate; lobes longer than tube, ovate, glandular-pubescent on outer surface. **Stamens** 4, arising in throat of corolla, included; anthers ovate, with parallel thecae. **Ovary** superior, 2-carpellate, imperfectly 4-locular, with free-central, ± 4-winged placenta and a single pendent, orthotropous ovule in each locule; densely hirsute; style shorter than ovary, fleshy, conical, bilobed. **Fruit** a broadly ellipsoid, compressed capsule, opening by 2 (or 4) thick valves. **Seed** usually solitary by abortion and germinating before fruit drops; endosperm fleshy.

Monotypic family; *Avicennia*, with 14 species, occurs in the tropics and subtropics of both the Old and New World, being one of the major constituents of almost all coastal mangrove lagoons; sthn Afr.: genus 1, species 1.

Endlicher: 314 (1841); Moldenke: 149 (1973).

The family Avicenniaceae has often been included in the Verbenaceae as a monotypic subfamily but is treated here as a segregated family on morphological grounds.

Avicennia L. 7205000

Linnaeus: 110 (1753); Baker: 331 (1900); Pearson: 225 (1912); Moldenke: 149 (1973); Moldenke & Moldenke: 126 (1983); Duke: 302 (1991); Verdcourt: 144 (1992).

Description as for family.

Species ± 14, mangroves, fairly cosmopolitan in warm estuarine waters; 1 in sthn Afr.: *Avicennia marina* (Forssk.) Vierh., along the coast of KwaZulu-Natal to Gonubie (Eastern Cape).

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Balanitaceae

(Rosidae—Sapindales)

Compiled by R.H. Archer

Shrubs or trees, with simple or forked spines. **Leaves** alternate, 2-foliolate; leaflets obovate, elliptic or ovate-elliptic, entire; stipules 0. **Flowers** bisexual, regular, in axillary cymes. **Calyx**: sepals 5, free, somewhat leathery, villous on outer surface, tomentose within, 4 inner ones with membranous margins. **Petals** 5, free, somewhat fleshy, imbricate. **Disc** thick, 10-furrowed or 5-lobed. **Stamens** 10, inserted at base of disc; filaments free; anthers 2-thecous, opening by longitudinal slits. **Ovary** superior but partly immersed in disc, 5-locular, globose, with an apical pendulous ovule in each locule, villous; style short, terete or 5-grooved; stigmas 1–5, simple. **Fruit** a fleshy drupe, 1-seeded by abortion. **Seeds** with thick, oily cotyledons; endosperm 0. $x = 9$ (8) (polyploidy).

Genus 1, species ± 20, mostly in Africa, few in Malaysia; sthn Afr.: species 4.

Launert: 221 (1963); Heine & Schreiber: 1 (1966); Hutchinson: 327 (1973) and A.P.G.: 549 (1998) under Zygophyllaceae.

Balanites Delile 3980000

Delile: 221 (1813) name conserved; Launert: 221 (1963).

Description as for family.

Species ± 20; 4 in sthn Afr., Namibia, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

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Balanophoraceae

(Rosidae—Santalales)

Compiled by M. Jordaan

Herbaceous, fleshy, perennial root-parasites, without chlorophyll and roots, arising from variously shaped underground tubers, forming contact to host root and producing 1 or more unbranched inflorescence-bearing stems with or without leaves in lower part, upper part bearing scale-like leaves; plants monoecious or dioecious. **Leaves** spirally arranged or distichous, decussate or verticillate, scale-like, coloured, sometimes much reduced. **Inflorescences** many-flowered, much branched or simple, spadix-like; bracts scaly, ± transformed and reduced, triangular or peltate or reduced to a clavate structure, caducous or persistent. **Flowers** unisexual, rarely bisexual. **Male flowers** with a perianth of 3–9 tepals; stamens 2 or 3(4), free or confluent into a synandrium, opposite perianth segments; anthers dehiscing longitudinally or by apical pores. **Female flowers** with 3 or 0 perianth segments; ovary ± inferior, 3- or 4-merous, with 1 pendulous ovule (represented by an embryo sac without nucellus or integuments) in each locule; placentas and carpels often not recognisable; style 1, columnar or much reduced; stigma inconspicuous or ± capitellate. **Fruit** small, a 1-seeded achene. **Seed** with large-celled granular endosperm.

Genera 18, species ± 43, widely distributed in the tropics and subtropics of both hemispheres; in Africa 6 genera and 6 species: sthn Afr.: genera 2, species 2.

Richard: 404, 429 (1822) as Balanophoreae; Harvey: 572 (1862); Eichler: 117 (1873); Hooker: 232 (1880); Engler: 243 (1889); Hemsley: 434 (1911); Marloth: 170 (1913); Harms: 296 (1935); Hansen: 359 (1986).

Key to genera

Inflorescence simple, spadix-like, bearing male flowers above and female flowers below; stamens 2; style present; plants monoecious, usually parasitic on roots of Proteaceae ..... **Mystropetalon**

Inflorescence much branched, bearing unisexual flowers only; stamens 3(4); style 0; plants dioecious, usually parasitic on roots of *Acacia* and *Ekebergia* species ..... **Sarcophyte**

Mystropetalon Harv. 2155000

Harvey: 418 (1838); Griffith: 336 (1845); Hooker: 31 (1856); Harvey: 573 (1862); Eichler: 124 (1873); Hooker: 234 (1880); Engler: 252 (1889); Marloth: 171 (1913); Harms: 312 (1935); Visser: 44 (1981); Hansen: 370 (1986).

Reddish to yellowish white parasites, usually on roots of Proteaceae; monoecious. **Leaves** scale-like, fleshy or sometimes linear. **Inflorescence** a dense, often clavate spike, resembling a fungus, with female flowers below and male flowers above, rarely flowers all female, subtended by 1 coloured bract and 2 bracteoles. **Male flowers**: perianth with 3 segments, 2-lipped; lower lip of 1 lobe; upper lip of 2 lobes; stamens 2, arising on upper perianth segments; anthers 2-thecous, dehiscing longitudinally. **Female flowers** ripening before male, seated on a globular, fleshy receptacle; perianth segments 3, valvate, urceolate or tubular; staminodes 2, small or 0; ovary 3-merous, embedded in and fused to perianth tube, 1- or 3-locular, with 3 pendulous ovules; style columnar; stigma discoid or 3-lobed. **Fruit** a pseudonut, almost spherical, inserted on enlarged receptacle. **Seed** solitary.

Monotypic, Western Cape, almost exclusively southwest of Breede River.

Sarcophyte Sparrm. 2158000

Sparrman: 300, t. 7 (1776); Griffith: 338 (1845); Hooker: 29, t. 1/C (1856); Harvey: 573 (1862); Eichler: 126 (1873); Hooker: 234 (1880); Engler: 252 (1889); Hemsley: 435 (1911); Harms: 314 (1935); Hansen: 364 (1986); Hansen: 1 (1993).

Reddish, fleshy parasites; tuber subspheroidal, furrowed; dioecious. **Leaves** many, spirally arranged, scale-like, coloured. **Inflorescences** fleshy, paniculately branched, each branch subtended by a bract slightly smaller than leaves. **Male plants**: inflorescence branches with many shortly pedicellate flowers in groups of 2 or 3 on short secondary branches; male flowers: 3(4)-merous; tepals valvate; stamens with well developed filaments, inserted at base of perianth segments; anthers many-thecous, opening by apical pores. **Female plants**: inflorescence branches with 5–12 subglobular, almost sessile, spadix-like clusters of ± 200 flowers completely sunk in a common receptacle; perianth segments 0; ovary 3(4)-merous, fused together, each 1-locular or at length 3-locular through intrusion of placentas, with 1–3 pendulous ovules; stigma discoid, sessile, peltate on a much reduced style, almost covering surface of receptacle. **Fruit** a syncarp, individual fruits of each head developing into a globose pseudoberry. **Seed** solitary.

Monotypic with 2 subspecies, confined to tropical east and sthn Afr.; 1 in sthn Afr.: *Sarcophyte sanguinea* Sparrm. subsp. *sanguinea* occurs in southernmost Mozambique and eastern sthn Afr., Northern Province, Mpumalanga, KwaZulu-Natal and Eastern Cape.

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Balsaminaceae

(Rosidae—Geraniales)

Compiled by R.H. Archer

Soft, subsucculent, glabrous herbs; stems ± translucent, rarely woody at base; usually in damp, shady places. **Leaves** opposite or alternate, rarely whorled or radical, simple, entire or variously toothed, usually petiolate; stipules 0. **Flowers** bisexual, very irregular, resupinate, attractive, 1–many, on axillary peduncles, sometimes paniculate, sometimes peduncles clustered. **Sepals** 3(–5), free, imbricate, 2 laterals flat, usually green, the lowermost petaloid, usually coloured, produced into a hollow spur or sac. **Petals** 5, usually ± connate, anterior one largest, laterals 2-lobed. **Stamens** 5; filaments free and linear below, broadened above and connate; anthers 2-thecous, large, elliptic, cohering to form a cap over ovary. **Ovary** superior, 5-locular, with few to many ovules in each locule on axile placentas; style absent; stigma simple, sessile, 5-toothed or -lobed. **Fruit** an explosively dehiscent loculicidal capsule, opening elastically into 5 twisted valves from placentiferous axis. **Seeds** smooth or tubercled, glabrous or hairy; embryo straight; endosperm 0. $x = 7, 8, 10$ (3, 5, 6, 9, 13) (polyploidy, B-chromosomes).

Genera 2, species ± 850, cosmopolitan in tropical and subtropical climates; sthn Afr.: genus 1, species 4.

Grey-Wilson: 1 (1980).

Impatiens L. 4856000

Linnaeus: 937 (1753); Sonder: 312 (1860); Launert: 162 (1963); Grey-Wilson: 1 (1980).

Description as for family.

Species ± 850, mainly northern hemisphere, tropical Africa, tropical Asia to North America; 4 in moist eastern parts of sthn Afr.

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Basellaceae

(Caryophyllidae—Caryophyllales)

Compiled by M. Jordaan

Subsucculent perennial herbs with slender to fairly robust twining stems, usually glabrous, decumbent to procumbent, often renewed from tubers or thickened, ± woody stem bases; roots fibrous or often ± thickened; plant mucilaginous, lacking anomalous secondary growth and anthocyanins. **Leaves** alternate, simple, lanceolate to broadly elliptic, cordate or obovate, entire, with ± thin margin, usually petiolate, somewhat fleshy; stipules 0. **Inflorescences** axillary or terminal bracteate spikes, racemes or panicles, indeterminate or pseudodeterminate; bracts small, thin, deciduous or persistent, lanceolate to triangular, subtending a pedicel or sessile flower; bracteoles 2–4, frequently subtending flower. **Flowers** bisexual, rarely functionally unisexual, regular, small. **Sepals** 2, coloured, free to base or partly connate. **Petals** 5, membranous or fleshy, with short tube and persistent, imbricate lobes. **Stamens** 5, epipetalous, connate at base and adnate to corolla lobes; anthers included or exserted, dorsifixed or basifixed, 2-thecous, extrorsely dehiscent by longitudinal slits, whitish, yellowish, reddish, or violet. **Ovary** superior, 3-carpellate, 1-locular; ovule solitary, basal, bitegmic, amphitropous to campylotropous; style 1, 3-partite ± to middle or almost to base, sometimes persistent; stigmas linear to capitate. **Fruit** a thin-walled nutlet, globose to ± obliquely pyriform, smooth to ribbed, surrounded by persistent perianth. **Seed** nearly spherical, with membranous testa; embryo ring-like to spirally twisted.

Genera 4, species ± 20, mainly in tropical and subtropical South America but also in Africa and Asia; sthn Afr.: genera 2 (1 exotic), species 2.

Moquin-Tandon: 10 (1840); Hooker: 43 (1880); Volkens: 124 (1893); Franz: 1 (1908); Ulbrich: 263 (1934); Sperling & Bittrich: 143 (1993).

Key to genera

Flowers pedicelled; plants often with axillary aerial tubers; fruit ± 1 mm in diameter, without swollen receptacle ..... ***Anredera**

Flowers sessile; plants without aerial tubers; fruit 2–3 mm in diameter, on a swollen, coloured receptacle ..... **Basella**

***Anredera** Juss. 2428000

Jussieu: 84 (1789); Hooker: 78 (1880); Volkens: 128 (1893); Ulbrich: 271 (1934); Bogle: 590 (1969); Sperling & Bittrich: 146 (1993); Eriksson: 67 (1996).

Boussingaultia Kunth: 194. t. 645 (1825). *Tandonia* Moq.: 226 (1849).

Twining or scrambling, herbaceous subsucculent vines; roots often thickened; stems smooth, glabrous, producing axillary, subterranean to aerial tubers up to 25 mm thick. **Leaves** slightly fleshy, often tinged with red, shortly to distinctly petiolate. **Inflorescences** axillary or terminal panicles or racemes, with many small, pedicellate flowers in axils of small bracts; bracteoles subtending flower distinctly developed, persistent or deciduous, ± thin, triangular to broadly ovate, free or sometimes connate at base, ± entire. **Flowers** bisexual or functionally unisexual, chasmogamous, fragrant. **Sepals** ± adnate to floral cup, sometimes ± strongly keeled, slightly shorter than petals, patent to erect, rhombic or rounded ovate to elliptic, free, adnate to petals at base. **Petals** with 1–3 ± distinct veins, patent to erect, small, thin to fleshy, connate only at base, spreading at maturity, white or yellowish to reddish. **Stamens** free to base or shortly connate, opposite and inserted on petal bases; filaments filiform or subulate, recurved in bud; anthers oblong, versatile. **Ovary** globose to pyriform; ovule 1, subsessile; style 1, 3-partite up to about middle, with clavate to capitate stigmas. **Fruit** a nutlet, smooth, partly or com-

pletely enclosed by persistent dry perianth. **Seed** erect, lenticular, with crustaceous seedcoat; embryo semi-annular. $x = 12$ (1 report).

Species 10–15, from S Florida and Texas to Argentina, the majority of species occurring in northern South America; cultivated as ornamentals and 1 naturalised in sthn Afr.: **Anredera cordifolia* (Ten.) Steenis, locally a noxious invader.

Basella L. 2424000

Linnaeus: 272 (1753); Linnaeus: 133 (1754); Lamarck: 381 (1783); Jussieu: 84 (1789); Hooker: 76 (1880); Volkens: 126 (1893); Franz: 25 (1908); Baker & Clarke: 94 (1909) (under Chenopodiaceae); Ulbrich: 266 (1934); Verdcourt: 498 (1964); Verdcourt: 1 (1968); Stannard: 161 (1988); Sperling & Bittrich: 145 (1993); Eriksson: 59 (1996).

Twining vines to procumbent perennial herbs; stem glabrous or young stem puberulous. **Leaves** ovate, somewhat fleshy. **Inflorescence** an axillary, pedunculate panicle of spikes; bracteoles 2, subtending flower, minute or distinctly developed, persistent, thin, ovate to triangular, free, entire to erose at margin, obtuse to acute at apex. **Flowers** bisexual, sessile, partly sunken into rachis. **Sepals** shorter than petals or equally long, patent to erect, ovate to elliptic, greenish white. **Petals** connate only at base, green or yellow-green. **Stamens**: filaments connate at base; anthers with thecae free at apex. **Ovary** globose to pyriform, free; ovule on a short basal stalk; style 3-partite ± to base; stigmas linear. **Fruit** a nutlet, smooth and often shiny, with 6 longitudinal ribs, on a swollen, fleshy, reddish to purplish receptacle. **Seed** erect, subglobose; embryo spirally twisted. $x = 11$ (aneuploids).

Species ± 5; 1 species: *Basella alba* L. (= *Basella rubra* L.) widespread in Africa and Asia and elsewhere cultivated for its edible leaves and locally naturalised in tropical and subtropical areas worldwide; 3 endemic to Madagascar; 1 endemic to eastern Africa and sthn Afr.: *Basella paniculata* Volkens, KwaZulu-Natal.

This generic treatment is based largely on *Basella paniculata*, which differs markedly from other species of the genus and is perhaps better placed in a genus of its own (Eriksson 1996).

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Begoniaceae

(Dilleniidae—Violales)

Compiled by C.L. Bredenkamp

Monoecious herbs or undershrubs, mostly fleshy, generally erect, sometimes creeping or climbing by means of adventitious roots, or acaulescent with a rhizome or tuber. **Leaves** alternate, rarely subradical, petiolate, generally asymmetrical, digitately nerved, margins entire, toothed, lobed or dissected; stipules 2, conspicuous, persistent or caducous. **Inflorescences** axillary, cymose, bracteate. **Flowers** regular or irregular, unisexual, showy. **Male flowers**: tepals usually 2 or 4, rarely many or 0, petaloid; stamens many, filaments free or connate; anthers 2-thecous, dehiscing laterally; ovary rudimentary or 0. **Female flowers**: tepals 5 or 6, sometimes 4, petaloid; staminodes 0 or rarely represented by glands; ovary inferior or rarely half-inferior, usually 3-, rarely 2- or 5-locular, usually 3-winged or angled; ovules many on projecting, simple or lobed axile placentas; styles (2)3(–5), free or connate at base, 2-fid, stigmas entire or branched, often twisted, papillose. **Fruit** usually a capsule, 3-winged or 3-angled, rarely terete or 4-angled. **Seeds** many, minute; testa reticulate; endosperm 0; embryo straight. $x = 14$ (11, 12, 13, 15, 19) (high polyploidy).

Genera 5, species ± 900, mostly in *Begonia*; mainly warm, wet parts of America and Asia, relatively few in Africa; only *Begonia* with 6(5) species in sthn Afr.

Sonder: 480 (1862); Candolle: 266 (1864); Hilliard: 136 (1976).

Begonia L. 5397000

Linnaeus: 1056 (1753); Linnaeus: 475 (1754); Sonder: 480 (1862); Candolle: 266 (1864); Hilliard: 136 (1976); De Lange & Bouman: 1 (1992).

Description as for family.

Species ± 900 species described, mainly tropical America and Asia; 6 or perhaps only 5 native in sthn Afr.

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Bignoniaceae

(Asteridae—Scrophulariales)

Compiled by S.J. Smithies

Trees, shrubs, some scrambling, or climbers, rarely spiny, with several types of glands but not mucilaginous. **Leaves** opposite or sometimes whorled, at times solitary or fascicled on dwarf shoots, usually compound, with articulated leaflets, sometimes simple, terminal leaflet sometimes a tendril; stipules 0, but sometimes with pseudostipules (modified external scales of axillary bud). **Flowers** bisexual, ± irregular, often large and brightly coloured, in terminal or lateral panicles or racemes that sometimes terminate in cymose branching, or sometimes borne on old wood. **Calyx** gamosepalous, shortly (2–4)5(6)-lobed or -toothed or spathaceous, shorter than corolla tube. **Corolla** gamopetalous, 5(6 or 7)-lobed; often bilabiate with posterior lip usually bilobed, anterior lip trilobed; rarely regular; limb usually imbricate, shorter than tube; tube conspicuous, tubular to campanulate or funnel-shaped, often pilose inside around base of stamens. **Stamens** usually 4, didynamous, sometimes with a posterior staminode, or 5 and equal, arising in corolla tube, usually ± at rim of narrow basal part, alternating with corolla lobes; filaments filiform or flattened, slightly thickened and often dilated and/or hairy at base; anthers bithecate, attached at apex, with parallel, divergent or divaricate thecae, dehiscing longitudinally, introrse. **Nectary/disc** usually present, hypogynous, symmetric, annular or cupular. **Ovary** superior, syncarpous, bicarpellate, usually bilocular and not divided at this stage by a false septum, with placentation axile, or rarely unilocular with parietal placentation; ovules many, anatropous, erect, in 2–several rows per locule; style simple, filiform or somewhat stout; stigma of 2 flattened, ovate or oblong lobes. **Fruit** typically a bivalved, loculicidal or septicidal capsule, with valves splitting perpendicularly or parallel to septum respectively, or rarely a fleshy and indehiscent berry. **Seeds** usually flat, with a broad, hyaline wing, rarely wingless; endosperm 0.

Genera ± 109, species ± 750, cosmopolitan but mostly tropical, especially South America; sthn Afr.: genera 8 (2 naturalised), species 13, widespread with exception of Lesotho; many exotic ornamentals including **Jacaranda*, *Tecoma*, **Dolichandrone*, **Macfadyena* and **Spathodia*.

Sprague: 447 (1904); Merxmüller & Schreiber: 1 (1967); Gentry: 1 (1977); Palgrave: 827 (1977); Van Steenis: 114 (1977); Goldblatt & Gentry: 475 (1979); Gentry: 1 (1980); Diniz: 61 (1988); Gentry: 1 (1992); Diniz: 11 (1993); Mabberley: 87 (1997); Van Wyk & Van Wyk: 21, 414 (1997).

Key to genera

1a Ovary unilocular; fruit indehiscent, fleshy and fibrous within; seeds not winged ..... **Kigelia**
1b Ovary bilocular; fruit capsular; seeds winged:
2a Capsule slightly compressed, covered with prickly warts ..... **Catophractes**
2b Capsule compressed, smooth:
3a Calyx spathe-like, split down posterior side ..... **Markhamia**
3b Calyx 5-toothed or -lobed:
4a Capsule suborbicular; leaves bipinnate ..... ***Jacaranda**
4b Capsule linear, linear-oblong or oblong to elliptic; leaves simple, bifoliolate or pinnate:
5a Lianas; leaves often with a terminal trifid tendril ..... ***Macfadyena**
5b Trees, shrubs, or subshrubs; leaves without tendrils:
6a Stamens 5; ovules in 2 rows in each locule; fruit beaked ..... **Rhigozum**
6b Stamens 4, staminode 0 or 1; ovules in 2–8 rows in each locule; fruit not beaked:
7a Corolla tube curved, narrowly funnel-shaped; stamens exserted ..... (=*Tecomaria*) **Tecoma** in part
7b Corolla tube cylindrical below, campanulate above; stamens included:
8a Calyx inflated; scrambling shrub or subshrub; flowers pink ..... **Podranea**
8b Calyx not inflated; if shrub then not scrambling; flowers yellow ..... ***Tecoma stans**

Catophractes D.Don 7723000

Don: 4 (1839); Sprague: 453 (1904); Verdoorn: t. 1060 (1949); Merxmüller & Schreiber: 2 (1967); Palgrave: 830 (1977); Diniz: 70 (1988).

Shrubs or small trees, rigid and spiny, much branched from base; branches divaricate, densely stellate-pubescent, but glabrescent, sometimes spine-tipped or reduced to spines. **Leaves** simple, opposite, often fascicled, petiolate, densely stellate-pubescent, irregularly toothed to crenate. **Flowers** 1 or more, usually 2, terminal or axillary, ± dense in uppermost part of branches, sessile. **Calyx** ribbed, tube shortly split down one side; lobes 5(6), filiform, pubescent like leaves. **Corolla** subbilabiate, 5(6 or 7)-lobed, white, pale green, cream or pink; tube long-cylindrical, becoming funnel-shaped above, many-ribbed, glabrous outside, pilose in lower half; lobes suborbicular, spreading to reflexed. **Stamens** as many as corolla lobes, arising below middle of corolla tube, slightly exserted; filaments terete, adnate to tube for ± two-thirds of their length; anthers bluntly apiculate, with thecae connate in upper part, free and parallel to slightly diverging below. **Nectary** thick, shallowly cupular, somewhat crenate. **Ovary** subglobose, scabrous, bilocular; ovules few in 2 rows per locule; style filiform, exserted; stigma of 2 elliptic-oblong lobes. **Fruit** an elliptic, beaked capsule, slightly compressed parallel to septum; walls thick, woody; valves boat-shaped, with short, prickly warts. **Seeds** disc-like, with ± surrounding, papery wing.

Monotypic: *Catophractes alexandri* D.Don, subtropical and sthn Afr.: Namibia, Botswana, and adjacent parts of South Africa, from ± Messina (Northern Province) to Gordonia (Northern Cape); also in Angola and Zimbabwe; often associated with limestone.

*Jacaranda Juss. 7725000

Jussieu: 138 (1789); Don: t. 631 (1822); Gentry: 72 (1977); Gentry & Morawetz in Gentry: 51 (1992); Henderson: 88 (1995).

Deciduous or semideciduous, medium to large trees; branchlets terete. **Leaves** bipinnate, opposite, pinna rachis subwinged; leaflets many, narrowly elliptic, sessile. **Flowers** pedicellate, in an open, terminal panicle. **Calyx**

reduced, 5-denticulate, broadly campanulate, subpuberulous. **Corolla** tubular-campanulate above a slightly narrowed, curved tube, mauvish blue, rarely white, pubescent outside; tube white, partly pubescent inside; limb slightly bilabiate; lobes 5, rounded, ± equal, spreading. **Stamens** 4, didynamous, arising ± at top of narrow part of corolla tube, included; filaments pubescent below middle; anthers glabrous, unithecate as second theca reduced to minute appendage; staminode 1, exceeding stamens, glandular-pubescent at middle and apex. **Nectary** short, pulvinate. **Ovary** flattened-cylindrical, bilocular, with 2 axile, vertical, placental ridges per locule, glabrous; ovules 6–8-seriate in each locule; style filiform, included, tapering slightly into bilobed stigma. **Fruit** a woody capsule, broadly oval to suborbicular, apex often a little emarginate, base truncate to subcordate, strongly compressed perpendicularly to the septum, dehiscing parallel to the plane of compression; valves glabrous, smooth, margins not or slightly undulate. **Seeds** thin, with wing ± surrounding and clearly demarcated from seed body, hyaline-membranous with brownish streaks. $x = 9$ (polyploidy).

Species ± 49 species, neotropical; 1 in sthn Afr.: **Jacaranda mimosifolia* D.Don, from northwest Argentina to Bolivia, widely cultivated as an ornamental tree, naturalised in warmer parts extending from Soutpansberg (Northern Province) to Grahamstown (Eastern Cape), also in Swaziland. It is a proposed declared invader.

Kigelia DC. 7761000

Candolle: 135 (1838); Sprague: 454 (1904); Sprague: 533 (1906); Phillips: t. 573 (1935) as *K. pinnata*; Merxmüller & Schreiber: 2 (1967); Palgrave: 833 (1977); Diniz: 83 (1988).

Medium to large trees of varying habit, usually with a rounded crown; branches often stout, spreading. **Leaves** imparipinnate, opposite or ternate, petiolate; leaflets large, elliptic; foliar morphology very variable. **Flowers** large, pedicellate, in pendulous, long-peduncled, lax panicles; pollinated by bats. **Calyx** 2–5-lobed, leathery; tube campanulate to almost tubular, 5-ribbed; lobes sometimes apiculate. **Corolla**: tube slightly curved, cylindrical below, widely campanulate above, leathery, glabrous; limb bilabiate; upper lip short, erect; lower lip longer, deflexed; lobes 5, ± obovate; yellowish at first, then reddish to purplish. **Stamens** 4, didynamous, arising at top of the cylindrical part of corolla tube, subexserted; filaments thick, linear, leathery, pilose at base; anther thecae separating and sometimes with an apical, fleshy, bilobed appendage; staminode 1. **Nectary** annular, thick, 5-lobed, leathery, tomentose. **Ovary** terete, unilocular; placentas 2, parietal and much intruded; ovules many in many rows; style subterete, subexserted; stigma of two elliptic lobes. **Fruit** large, sausage-shaped, pendulous, hard-walled, indehiscent; pulp fibrous. **Seeds** many, thick, wingless, with coriaceous testa intruded between cotyledons. $x = 10$ (21) (aneuploids).

Monotypic: *Kigelia africana* (Lam.) Benth.; mainly tropical Africa; also in sthn Afr.: Namibia, Botswana, South Africa, from ± Messina (Northern Province), through lowveld (Mpumalanga) to KwaZulu-Natal, possibly as far south as Durban; also in Swaziland.

***Macfadyena** A.DC. 7706000

Candolle: 179 (1845); Bailey & Bailey: 692 (1977); Gentry: 85 (1977); Henderson: 96 (1995).

Doxantha Miers: 189 (1863).

Perennial lianas; roots usually with conspicuously swollen tubers; stems irregularly striate, lenticellate, branchlets terete, often rooting at nodes, attached to support by adventitious rootlets. **Leaves** with 2 lanceolate to broadly ovate leaflets, often with a terminal trifid, hooked tendril; opposite, petiolate; pseudostipules small, ± ovate. **Flowers** large, pedicellate, in an axillary panicle, usually reduced to 1 or 3 flowers but rarely up to 15; peduncles short, branches ± glabrous. **Calyx** membranous, cupular, subtruncate with sinuous margin, glabrous to slightly lepidote. **Corolla** tubular-campanulate, yellow; tube glabrous outside, glabrous or partly puberulous or pubescent inside; limb oblique; lobes obovate, shorter than tube. **Stamens** 4(5), didynamous, included, arising at top of narrow part of corolla tube; anthers glabrous, thecae straight, divaricate; staminode 1(0). **Ovary** linear, minutely lepidote to subpuberulous, bilocular; ovules in 4 rows per locule but may appear as 2 in cross sections. **Nectary** annular. **Fruit** a long, narrow, linear capsule, tapering at ends, compressed, leathery; valves parallel to septum; dehiscence septicidal. **Seeds** membranous, with 2 wings not sharply demarcated from seed body, blunt-ended, mostly brown and irregularly hyaline at apex.

Species 3 or 4, centred in tropical America; 1 exotic in sthn Afr., **Macfadyena unguis-cati* (L.) A.Gentry, a widespread garden escape but naturalised in Levubu, Magoebaskloof and Duiwelskloof (Northern Province), Sabi and possibly Nelspruit (Mpumalanga), and Durban and Pietermaritzburg areas (KwaZulu-Natal).

Markhamia Seem. ex Baill. 7744000

Baillon: 47 (1888) ('1891'); Merxmüller & Schreiber: 3 (1967); Palgrave: 830 (1977); Ross: t. 1757 (1977); Diniz: 72 (1988).

Trees or shrubs; young branches minutely lepidote, sometimes with conspicuous lenticels, or velvety tomentose but soon glabrescent. **Leaves** imparipinnate, opposite, petiolate; leaflets ovate or elliptic, sometimes acuminate; pseudostipules well developed, subcircular to reniform, or ovate to subulate-acuminate. **Flowers** in terminal or lateral axillary panicles or racemes, pedicellate. **Calyx** spathaceous, split down posterior side, boat-shaped, cuspidate or hooked at apex, ± coriaceous. **Corolla** ± bilabiate, yellow-greenish and maroon, or yellow with reddish striae; tube cylindrical or funnel-shaped at base, campanulate above; lobes 5, shorter than tube, obovate, glandular on inner face. **Stamens** 4, didynamous, included; filaments terete, sometimes glandular and thickened at base; anthers with thecae connate above, divergent below; staminode sometimes 1. **Nectary** annular or cupular, crenate. **Ovary** oblong, attenuate, bilocular; ovules many, in 4–6 rows per locule; style terete, included; stigma of two obovate lobes. **Fruit** a long, linear, ± straight to falciform capsule, glabrous or minutely tomentose; valves 2, flattened and dehiscing parallel to a false septum borne in middle of a very small true septum. **Seeds** subrectangular with 2 papery, subrectangular wings; testa somewhat coriaceous. $x = 10$ (polyploidy).

Species 10, mainly tropical Africa, also Asia; 2 in sthn Afr., Namibia, Botswana and in the far north of South Africa (Northern Province); also possibly further south in Kruger National Park (Mpumalanga).

Podranea Sprague 7716010

Sprague: 449 (1904); Verdoorn: t. 1347 (1961); Gentry: 122 (1977); Diniz: 79 (1988); Gentry: 111 (1992).

Scrambling shrubs or subshrubs, almost glabrous; branchlets terete to 4-angled, lenticelled. **Leaves** imparipinnately compound, without tendrils, opposite, petiolate; leaflets elliptic-ovate, entire or remotely toothed; pseudostipules 0. **Flowers** large, in terminal panicles. **Calyx** cupular-campanulate, evenly 5-lobed, inflated; tube ridged, glabrous; lobes almost as long as tube, ovate, apiculate, ciliate. **Corolla** somewhat bilabiate and vertically compressed, pink or lilac; tube campanulate above a short cylindrical base, glabrous outside, glandular within on lower part, with stalked hairs, pilose in throat; lobes obovate. **Stamens** 4, didynamous,

arising at top of narrow portion of corolla tube, included; filaments subterete, with stalked glands on basal part; anthers with 2 thecae connate only at apex, straight, divaricate when mature; staminode 1. **Nectary** thick, saucer-shaped, somewhat crenate. **Ovary** linear, ± cylindrical, tapering into style, glabrous, bilocular; ovules many, in 6–8 rows per locule; style semiterete, slightly exserted; stigma with two ± oval lobes. **Fruit** a long, narrow, linear, straight capsule, with acute apex, somewhat flattened, leathery, smooth, dehiscing perpendicularly to septum. **Seeds** with 2 ± rectangular wings; testa membranous.

Species 1 or 2, Africa; 1 in sthn Afr.: *Podranea ricasoliana* (Tanfani) Sprague, from Port St Johns (Eastern Cape); possibly conspecific with *P. brycei* (N.E.Br.) Sprague, from Zimbabwe, Malawi and Mozambique.

Rhigozum Burch. 7722000

Burchell: 299 (1822); Sprague: 450 (1904); Sprague: 530 (1906); Phillips: t. 381 (1930); Merxmüller & Schreiber: 4 (1967); Palgrave: 828 (1977); Diniz: 67 (1988).

Shrubs or small trees, typically much branched, sometimes trichotomously; branches rigid, sometimes spine-tipped. **Leaves** simple, trifoliolate or imparipinnate, solitary or fascicled on variously spaced, cushion-like, dwarf lateral branchlets. **Flowers** in fascicles on lateral cushions or solitary, shortly pedicellate. **Calyx** campanulate, 5-toothed, subglabrous to variously pubescent. **Corolla** 5-lobed, yellow, white or pink; tube ± cylindrical below, campanulate above, scantily pilose inside, at least on lower part of tube; lobes obovate, spreading. **Stamens** 5, arising near base of campanulate portion of corolla tube, slightly exserted; filaments terete, pilose at base; anthers oblong; thecae free at base only. **Nectary** thick, shallowly saucer-shaped, entire or lobed. **Ovary** ovoid, bilocular; ovules many, biseriate in each locule; style terete, slightly exserted; stigma of 2 ovate, somewhat fleshy lobes. **Fruit** an oblong to elliptic, shortly-beaked, compressed capsule, splitting perpendicularly to septum into 2 smooth valves. **Seeds** paper-winged.

Species 7, Africa and Madagascar; 5 in sthn Afr., widespread except for Lesotho, mainly in karroid areas from Botswana to near Grahamstown (Eastern Cape). *Rhigozum trichotomum* Burch. has become invasive in several areas due to veld mismanagement.

Tecoma Juss. 7733000

Jussieu: 139 (1789); Van Steenis: 134 (1977); Dos Santos & Miller: 356 (1992); Gentry: 273 (1992); Brummitt: 419 (1974); Brummitt: 421 (1992); Henderson: 149 (1995); Mabberley: 702 (1997).

Tecomaria (Endl.) Spach: 137 (1838): Sprague: 448 (1904); Phillips: t. 903 (1943); Gentry: 161 (1977); Diniz: 64 (1988); Diniz: 11 (1993); Van Wyk & Van Wyk: 416 (1997).

Shrubs, subshrubs, sometimes subscandent, or small trees; branches sometimes lepidote or lenticellate. **Leaves** simply imparipinnate, opposite, petiolate; leaflets ovate to elliptic, or lanceolate, terminal leaflets often acute or acuminate, sessile, crenate or serrate. **Flowers** pedicellate, in dense, terminal or subterminal racemes or racemose panicles; bracts ± linear or lanceolate. **Calyx** cupular or elongate-cupular, 5-dentate, ± puberulous or somewhat lepidote, ciliate. **Corolla** orange (natural) or scarlet, yellow or pink (cultivated), narrowly funnel-shaped and a little curved, or tubular-campanulate above a short, narrow base; tube glabrous outside, with some papillae or hairs within, mostly in lower part; limb bilabiate, all 5 lobes elliptic, obtuse. **Stamens** 4, didynamous, arising in lower part of corolla tube, sometimes adnate to beyond middle, exserted or included; filaments terete, with stalked glands on lower part; anthers linear-oblong, thecae connate in upper third and slightly divergent below or divaricate and not apically fused; staminode 0 or 1. **Nectary** cupular-pulvinate. **Ovary** oblong or narrowly cylindrical, bilocular; ovules many in 2 or 4 series per locule; style terete, exserted; stigma elliptic, bilobed. **Fruit** a capsule, linear-oblong and somewhat curved, or linear and straight, tapering at ends, compressed parallel to septum but dehiscing perpendicularly to it; valves smooth or wrinkle-ridged. **Seeds** thin with 2 hyaline, membranous wings, sharply demarcated from seed body and almost surrounding it. $x = 9$ (17) (aneuploids, polyploidy).

Species ± 13, 12 in Neotropics, 1 or 2 in Africa; 1 or 2 in sthn Afr.: *Tecoma capensis* (Thunb.) Lindl.; from Messina (Northern Province) to Barberton (Mpumalanga) and through KwaZulu-Natal to Uitenhage (Eastern Cape); also in Swaziland; widely cultivated as an ornamental. **Tecoma stans* (L.) Juss. ex Humb., Bonpl. & Kunth var. *stans*, an exotic, is becoming naturalised mainly in warmer areas and has been proposed as a declared invader.

Tecomaria (Endl.) Spach was reduced to synonymy under *Tecoma* by Van Steenis (1977), followed by Gentry (1992), contrary to his earlier view (Gentry 1977). The latter author maintained that the only character of potential generic significance is the manner in which the two thecae of the anthers diverge. As other bignoniaceous genera include a variety of thecae, Gentry opined that this difference does not seem to warrant generic separation. In addition, the two genera are interfertile and their wood anatomy is very similar (Dos Santos & Miller 1992). Brummitt (1992) and Mabberley (1997) use *Tecoma* but Diniz (1993) and Van Wyk & Van Wyk (1997) retain *Tecomaria*.

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Bombacaceae

[under Malvaceae—Bombacoideae, fide Bayer *et al.* (1999)]

(Dilleniidae—Malvales)

Compiled by C.L. Bredenkamp

Trees with fibrous and fleshy trunks, sometimes attaining a very large girth. **Leaves** alternate, simple on seedlings, digitately 3–9-foliolate on more mature plants; leaflets entire; stipules present. **Flowers** ± regular, bisexual, usually solitary, large, pendulous; large bracts and bracteoles usually present. **Calyx** leathery, 5-segmented or -lobed, valvate in bud. **Petals** 5, adhering to base of staminal tube, large and crinkled. **Stamens** many, united into a tube below; anthers reniform, 1-thecous, opening by longitudinal slits; pollen smooth. **Ovary** superior, 5–10-locular, with many axile ovules in each locule; style simple; stigma 5–10-lobed. **Fruit** indehiscent, woody. **Seeds** many, embedded in dry, white pulp. $x = 8$ (high polyploidy).

Genera 30, species ± 250, tropical and subtropical regions of Africa and Madagascar to India, Australia and America; sthn Afr.: 1 genus, 1 species.

Wild: 511 (1961); Friedrich-Holzhammer: 1 (1969).

**Ceiba pentandra* (L.) Gaertn. (5026000), Kapok Tree, from which the Kapok fibre of commerce is derived, has been cultivated in subtropical areas and may occasionally be found as a stray in KwaZulu-Natal.

(See note on family circumscription under Malvaceae.)

Adansonia L. 5023000

Linnaeus: 1190 (1753); Wild: 512 (1961); Baum: 440 (1995).

Description as for family.

Species 8, in 3 sections, tropical Africa, Madagascar and Australia, but dispersed widely by humans; 1 in sthn Afr.: *Adansonia digitata* L., the Baobab, Namibia, Botswana, Northern Province, North-West and Mpumalanga, rarely south of the Soutpansberg, except in cultivation.

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Boraginaceae

(Asteridae—Lamiales)

Compiled by E. Retief

Annual or perennial herbs, shrubs or trees, variably hairy, often strigose, trichomes often with conspicuous multicellular bases. **Leaves** alternate, sometimes opposite, subopposite or rosulate at base, simple, sessile or petiolate, usually entire; stipules 0. **Flowers** bisexual, regular or occasionally irregular, in terminal or axillary, bifurcate cymes or in raceme-like or panicled groups, inflorescence branches frequently scorpioid and spirally inrolled when young, uncoiling as flowers open; bracts leafy, small or 0. **Calyx** persistent, sometimes accrescent in fruit; tube campanulate or cylindric, sometimes very short; lobes usually 5, imbricate or open, rarely valvate. **Corolla** (2–)4–7-lobed, imbricate or contorted in bud; tube cylindric, ± funnel-shaped, campanulate or rotate, the tube very reduced; throat often with (faucal) scales, fornices, thickenings or folds between lobes. **Stamens** as many as and alternating with corolla lobes, epipetalous, exserted or included; filaments sometimes dilated at base, sometimes with a densely hairy scale or protuberance where arising on corolla; anthers 2-thecous, opening by longitudinal slits. **Disc** present or 0. **Ovary** superior, entire or deeply 4-lobed, 2-locular with 2 ovules in each or with 4, 1-ovuled locules due to development of false partitions; placentation at times appearing basal but actually axile; style terminal or gynobasic (arising from between ovary lobes), entire or 2–4-fid or twice 2-fid; stigmas various. **Fruit** usually a schizocarp of four 1-seeded nutlets (mericarps), or drupaceous with four 1-seeded stones, rarely a 1- or 2-seeded loculicidal capsule; gynobase (receptacle) conical or pyramidal or flat. **Seeds** erect, oblique or horizontal; endosperm 0 or scanty; embryo straight.

Genera ± 131, species ± 2500; widely distributed in mainly temperate and tropical regions of the Old and New World, with a major centre of diversity in the Mediterranean; sthn Afr.: genera 17 (4 exotic), species ± 105.

Jussieu: 128 (1789) as Borragineae; Candolle: 466 (1845) as Borragineae; Boissier: 123 (1879); Gürke: 71 (1897); Wright: 2 (1904); Lawrence: 684 (1951); Phillips: 625 (1951); Melchior: 431 (1964); Friedrich-Holzhammer: 1 (1967b); Riedl: 1 (1967); Taton: 1 (1971); Valentine & Chater: 83 (1972); Airy Shaw: 150 (1973); Mabberley: 74 (1989); Martins: 59 (1990); Al-Shehbaz: 1 (1991); Nowicke & Miller: 3 (1991); Verdcourt: 1 (1991); Zomlefer: 218 (1994); Riedl: 43 (1997).

Asperifoliaceae Rchb.: 118 (1828).

Classification of Boraginaceae

I. Subfamily WELLSTEDIOIDEAE: *Wellstedia*
II. Subfamily EHRETIOIDEAE: *Ehretia*
III. Subfamily CORDIOIDEAE: *Cordia*
IV. Subfamily HELIOTROPIOIDEAE: *Heliotropium*
V. Subfamily BORAGINOIDEAE
1. Tribe **Trichodesmeae**: *Trichodesma*
2. Tribe **Cynoglosseae**: *Afrotysonia*, *Cynoglossum*
3. Tribe **Eritrichieae**: **Amsinckia*, *Lappula*, **Rochelia*
4. Tribe **Myosotideae**: *Myosotis*
5. Tribe **Echieae**: *Echiostachys*, **Echium*, *Lobostemon*
6. Tribe **Lithospermeae**: **Buglossoides*, *Lithospermum*
7. Tribe **Boragineae**: *Anchusa*

Key to genera

1a Style terminal; fruit a capsule, drupaceous or breaking into 4 distinct 1-seeded nutlets (mericarps) or cohering in pairs; herbs, shrubs or trees:
2a Style undivided; flowers 5-merous; stigma usually ring-like below apex of style; fruit breaking into 4 distinct 1-seeded nutlets or cohering in pairs ..... **Heliotropium**
2b Style 2- or 4-fid; flowers 4- or 5-merous; stigma capitate or 0; fruit a capsule or drupaceous; perennial herbs, dwarf shrubs, shrubs, trees:
3a Flowers 4-merous; fruit a capsule; style 2-fid; perennial herbs becoming woody at stem bases ..... **Wellstedia**
3b Flowers 5-merous; fruit drupaceous; style 2- or 4-fid; perennial herbs, shrubs or trees:
4a Style 2-fid, the 2 branches each terminating in a capitate stigma; fruit a drupe, subglobose, with four 1-seeded stones ..... **Ehretia**
4b Style 4-fid, the 4 branches each terminating in an elongate or subcapitate stigma; fruit drupaceous with one stone, up to 4-locular but only one or two locules fertile ..... **Cordia**
1b Style gynobasic, fixed on a disc-like base between nutlets or apically on a conical or pyramidal gynobase (receptacle); fruit of 1 (*Trichodesma physaloides*) or 4 (rarely 2 or 3 by abortion) nutlets; annual or perennial herbs, occasionally shrubs:
5a Style on a conical or pyramidal gynobase (receptacle):
6a Calyx strongly accrescent in fruit; anthers with connectives prolonging into long, twisted appendages above thecae, androecium cone-like ..... **Trichodesma**
6b Calyx not or only slightly accrescent in fruit; anthers without prominent terminal appendages:
7a Stamens exserted, filaments long; corolla tube with small swellings at base ..... **Afrotysonia**
7b Stamens included, anthers subsessile; corolla tube without a swelling at base:
8a Nutlets 2, outer surface of nutlet with glochidia stellately arranged ..... ***Rochelia**
8b Nutlets 4:
9a Outer surface of nutlet verrucose ..... ***Amsinckia**
9b Outer surface of nutlet with glochidia (not stellately arranged):
10a Inflorescence ebracteate; nutlets attached to gynobase for the whole of their length ..... **Cynoglossum**
10b Inflorescence bracteate; nutlets attached to gynobase for only part of their length ..... **Lappula**
5b Style fixed basally on a disc-like gynobase (receptacle):
11a Corolla contorted in bud; anther connective prolonged into a small trulliform appendage ..... **Myosotis**
11b Corolla imbricate in bud; anther connective blunt, not prolonged:
12a Filaments with hairs, scales or protuberances present at base; corolla throat naked:
13a Ring, composed of a minute collar or 5–10 minute hairy lobules, present at base of corolla tube on inside; corolla irregular, bilabiate ..... ***Echium**
13b Hairs or scales present at base of filaments; corolla usually regular:
14a Filaments with hairs, sometimes tufted, at or near base ..... **Echiostachys**
14b Filaments with densely hairy scales, ridges or protuberances at base ..... **Lobostemon**
12b Filaments without hairs, scales or protuberances; corolla throat with vertical nectar guides, glandular appendages or scales:
15a Corolla throat bearing 5 well-developed, elongate, vertical nectar guides ..... ***Buglossoides**
15b Corolla throat without nectar guides, but with glandular appendages or scales:
16a Glandular appendages present in throat; nutlets without a collar-like ring around base ..... **Lithospermum**
16b Fornices present in throat; nutlets with a distinct, thickened, collar-like ring around base ..... **Anchusa**

Afrotysonia Rauschert 7072010

Rauschert: 558 (1982); Gürke: 98 (1897); Wright: 12 (1904); Mill: 467 (1986).

Tysonia Bolus: t. 1942 (1890) in part.

Perennial, erect herbs, pubescent; stems single, finely striate, terete. **Leaves** long-petiolate or sessile. **Flowers** in a branched panicle of 8–15-flowered helicoid cymes; pedicels ebracteolate, elongating considerably in fruit. **Calyx** divided nearly to base into 5 equal, lanceolate lobes; scarcely accrescent in fruit. **Corolla** white to dull yellow; tube campanulate or subrotate; faucal scales exserted from corolla throat, trapeziform, usually ob-

long-triangular; lobes 5, ovate, obtuse, sometimes rather fleshy. **Stamens** exserted; with filaments arising in middle of corolla tube, well below faucal scales; anthers oblong to ovoid. **Nectary scales** ± 10, situated at extreme base of corolla tube, each with 2 divergent horns. **Disc** thick, semiglobose. **Ovary** 4-lobed; gynobase conical; style gynobasic, filiform, subequalling stamens or slightly shorter; stigma small, capitate. **Fruit** of 1 or 4 nutlets; nutlets either depressed, wingless and densely glochidiate or strongly laterally compressed, lacking glochids but with broad, cartilaginous, ± undulate wing.

Species 3, Africa; 2 in sthn Afr.: *Afrotysonia africana* (Bolus) Rauschert and *A. glochidiata* (R.R.Mill) R.R.Mill, KwaZulu-Natal and Eastern Cape.

*Amsinckia Lehm. 7082000

Lehmann: 7 (1831); Candolle: 117 (1846); Bentham: 851 (1876); Gürke: 106 (1897); Brand: 204 (1921); Chater: 110 (1972); Al-Shehbaz: 98 (1991).

Annual herbs, often laxly decumbent, hispid or setose. **Leaves** alternate, usually lanceolate. **Flowers** in terminal, helicoid, usually ebracteate cymes. **Calyx** with 5 lanceolate lobes, some lobes sometimes connate; accrescent. **Corolla** yellow or orange, with a cylindrical tube, naked in throat, lobes 5, swollen at base, short-oblong. **Stamens** arising in upper part of corolla tube, included; anthers subsessile. **Ovary** 4-lobed, 4-locular, with a single ovule in each locule; gynobase pyramidal; ovules with a narrow, membranous, marginal rim; style gynobasic, almost as long as corolla tube, filiform; stigma capitate. **Fruit** of 4 nutlets; nutlets ovoid-trigonous, usually verrucose, attached to receptacle for only part of length; gynobase pyramidal. $x = 6, 17$ (8, 13, 29) (aneuploids, polyploidy).

Species ± 15, mainly in Central America; 2 introduced in sthn Afr.: **Amsinckia calycina* (Moris) Chater and **A. menziesii* (Lehm.) A.Nelson & J.F.Macbr., Northern, Western and Eastern Cape.

Anchusa L. 7093000

Linnaeus: 133 (1753); Linnaeus: 64 (1754); Candolle: 41 (1846); Bentham: 855 (1876); Gürke: 112 (1897); Wright: 16 (1904); Riedl: 232 (1967); Chater: 106 (1972).

Annual or perennial herbs, variously hairy. **Leaves** alternate, rosulate at base, sessile, linear or linear-lanceolate. **Flowers** in terminal, dichotomous cymes or simple, unilateral racemes at length loosely panicled; cymes scorpioid, bracteate. **Calyx** ± deeply 5-lobed; with campanulate tube; lobes linear, slightly enlarged in fruit. **Corolla** purple, blue or white; tube straight, cylindrical, short or of medium length; throat equal or slightly enlarged, with 5 ovate or oblong, papillose or hairy scales opposite lobes; lobes 5, imbricate, shorter than tube. **Stamens** arising in middle of corolla tube, included; filaments filiform; anthers linear, oblong, obtuse, longer than filaments. **Ovary** 4-lobed, 4-locular, with a single ovule in each locule; gynobase disc-like; style gynobasic, semiterete, as long as corolla tube; stigma capitate. **Fruit** of 4 nutlets; nutlets strongly convex on back, with marginal rim on face, rugose, a thickened collar-like ring present at base. $x = 6, 8$ (7, 11) (aneuploids, polyploidy, B-chromosomes).

Species ± 35, in Europe, North Africa and W Asia; 2 in sthn Afr.: **Anchusa azurea* Mill., introduced from Europe and *A. capensis* Thunb., indigenous in Namibia, Free State, Lesotho, Northern, Western and Eastern Cape.

*Buglossoides Moench 7109010

Moench: 418 (1794); Fernandes: 87 (1972); Al-Shehbaz: 129 (1991).

Annual or perennial herbs, rarely dwarf shrubs; usually hispidulous-strigillose; roots often purplish red. **Leaves** sessile or somewhat amplexicaul at base; lanceolate, linear-oblong, narrowly elliptic or oblanceolate. **Flowers** in terminal, scorpioid, bracteate cymes. **Calyx** divided almost to base into 5 narrow lobes, somewhat accrescent in fruit. **Corolla** white, blue or purple; tube infundibuliform or hypocrateriform; throat with 5 well-differentiated, longitudinal bands of hair and/or glands extending from base of corolla lobes downward to between tips of anthers; lobes 5, imbricate, rounded or truncate; annulus near base of corolla tube consisting of scale-like lobes or a narrow collar. **Stamens** included; filaments equal, shorter than anthers, arising below middle of tube; anthers oblong with a short apical appendage. **Ovary** 4-lobed, 4-locular; gynobase disc-like; style gynobasic, included, ± the same height as anthers; stigmas 2, subterminal. **Fruit** of 4 nutlets; nutlets erect to strongly divergent, ovoid to subpyriform, with a ± incurved or almost straight beak, rugose, tuberculate or smooth; attachment scar basal or nearly so, conspicuous. $x = 7$ (8) (polyploidy).

Species 15, in Europe and Asia; **Buglossoides arvensis* (L.) I.M.Johnst., naturalised in parts of sthn Afr., North-West, Gauteng, Free State, Lesotho, Northern and Eastern Cape.

Cordia L. 7038000

Linnaeus: 190 (1753); Linnaeus: 87 (1754); Candolle: 471 (1845); Bentham: 838 (1876); Boissier: 123 (1879); Gürke: 81 (1897); Wright: 4 (1904); Taton: 3 (1971); Warfa: 1 (1988); Martins: 60 (1990); Al-Shehbaz: 43 (1991); Miller: 8 (1991); Verdcourt: 3 (1991); Riedl: 68 (1997).

Trees or shrubs, variously hairy. **Leaves** alternate, rarely subopposite, petiolate, entire or coarsely toothed. **Flowers** usually yellow or white, bi- or unisexual, subsessile or pedicellate; borne in terminal or axillary dichotomous corymbs, panicles or subglobose clusters of cymes, the branches scorpioid, inflorescences ebracteate. **Calyx** tubular or campanulate; tube as long as corolla tube; lobes 3–5, shorter than tube, ovate; persistent, accrescent. **Corolla** white or yellow, with tube funnel- or salver-shaped; lobes 5, rarely 3–8, oblong, erect, spreading or reflexed, imbricate or somewhat contorted in bud. **Stamens** arising in mouth of corolla tube, included or exserted; filaments linear, glabrous or pubescent at base; anthers oblong. **Ovary** 4-locular with a thick, fleshy wall and a single, erect ovule in each locule; style terminal, 2-branched, with each branch 2-fid; stigmatic branches clavate or linear. **Fruit** a drupe, surrounded at base by a saucer-shaped calyx, with 1 stone, up to 4-locular but only 1 or 2 locules fertile. $x = 7, 8$ (6) (aneuploids, polyploidy).

Species 250–300, in tropical regions of both hemispheres, mainly America; 6 in sthn Afr., widespread except Northern and Western Cape.

Cynoglossum L. 7064000

Linnaeus: 134 (1753); Linnaeus: 65 (1754); Candolle: 146 (1846); Bentham: 848 (1876); Boissier: 263 (1879); Gürke: 98 (1897); Wright: 13 (1904); Brand: 114 (1921); Taton: 50 (1971); Martins: 102 (1990); Al-Shehbaz: 112 (1991); Nowicke & Miller: 25 (1991); Verdcourt: 102 (1991); Riedl: 79 (1997).

Paracynoglossum Popov: 717 (1953).

Perennial or biennial herbs, slightly branched, variably hairy. **Leaves** alternate; basal ones often long-petiolate, usually elliptic, cauline ones sessile, elliptic or lanceolate. **Flowers** in terminal or axillary, scorpioid cymes; cymes lengthen considerably in fruit, ebracteate; pedicellate or subsessile, bisexual. **Calyx** with a shallow tube; deeply 5-lobed, lobes ovate, elliptic or oblong, spreading or reflexed; not or slightly accrescent. **Corolla** white or blue; tube short, cylindrical or funnel-shaped,

with 5 crescent-shaped scales (fornices) in throat; lobes 5, spreading, ovate to broadly ovate, apices usually obtuse. **Stamens** included, arising at base of tube or just below scales, alternating with them; filaments very short; anthers ovate, elliptic to oblong, obtuse. **Ovary** 4-lobed, adhering to central stylar column only by part of internal face of each lobe; gynobase conical; style gynobasic, terete; stigma capitate. **Fruit** of 4 nutlets; nutlets depressed ovoid, densely covered with glochidia or smooth in part, glochidia often joined together to form a definite margin. $x = 6$ (high polyploidy).

Species ± 75, cosmopolitan in temperate and subtropical regions; 8 in sthn Afr., widespread, but absent from Namibia and Botswana.

Echiostachys Levyns 7117010

Levyns: 445 (1934); Phillips: 632 (1951).

Perennial herbs with somewhat woody rootstocks. **Leaves** linear-lanceolate, often tufted. **Flowers** in a dense pseudospike which is composed of many short cymes on a stout axis, occasionally interrupted at base, but rarely branched, elongating somewhat in fruit. **Calyx** of 5 free or nearly free sepals, conspicuously densely villous. **Corolla** white, pale blue or pink; with narrowly funnel-shaped tube and 5 obtuse, regular lobes. **Stamens** equal or subequal, arising in corolla tube, exserted; filaments with hairs at or near base, usually tufted. **Ovary** 4-lobed; gynobase disc-like; style simple, gynobasic; stigma small, obscurely 2-fid. **Fruit** of 4 nutlets; nutlets rugose-tuberculate or almost smooth.

Species 3, endemic in Western Cape.

*Echium L. 7118000

Linnaeus: 139 (1753); Linnaeus: 175 (1754); Candolle: 13 (1846); Bentham: 863 (1876); Boissier: 204 (1879); Gürke: 128 (1897); Wright: 43 (1904); Riedl: 213 (1967); Gibbs: 97 (1972); Al-Shehbaz: 137 (1991); Verdcourt: 81 (1991); Retief & Van Wyk: 167 (1998).

Annual, biennial or perennial herbs or shrubs, scabrid, hispid or canescent. **Leaves** alternate or whorled, sessile or petiolate, densely hairy. **Flowers** in unilateral, simple or forked scorpioid cymes; bracts small or foliaceous. **Calyx** divided into 5 short segments; usually accrescent. **Corolla** blue or purplish blue, bilabiate; tube broadly to narrowly funnel-shaped, straight, ± hairy outside, inside usually with a ring of 5–10 distinct scales or lobes or an undulate, entire, somewhat fleshy, collar-like membrane at base; throat ± oblique, open; with 5 short, obtuse lobes. **Stamens** sometimes unequal, 2 arising near base of corolla tube, 3 higher up, the longer ones exserted; filaments linear, glabrous or with a few, long hairs; anthers versatile. **Disc** present. **Ovary** 4-lobed, with a single ovule in each locule; gynobase disc-like; style gynobasic, exserted, linear, 2-fid; stigmas obtuse. **Fruit** of 4 nutlets; nutlets convex on one face, bluntly keeled on other, usually rugose. $x = 8$ (7, 6) (aneuploids, high polyploidy).

Species 60, mainly endemic in Madeira, the Azores and Canary Islands, but also in Africa and Asia; 2 naturalised in sthn Afr.: **Echium plantagineum* L. and **E. vulgare* L., Gauteng, Mpumalanga, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

Ehretia P.Browne 7043000

Browne: 168 (1756); Linnaeus: 936 (1759); Candolle: 502 (1845); Bentham: 840 (1876); Boissier: 124 (1879); Gürke: 87 (1897); Wright: 4 (1904); Taton: 19 (1971); Martins: 75 (1990); Miller: 20 (1991); Verdcourt: 33 (1991); Riedl: 91 (1997).

Trees or shrubs, variously hairy. **Leaves** alternate or clustered on short side branches, sessile or shortly petiolate, obovate to orbicular, usually with entire margins; variously hairy or if surface glabrous then with hairs densely arranged along margin. **Flowers** white or blue to mauve, bisexual or polygamous, sessile or pedicellate in much branched, axillary or terminal cymose inflorescences, the individual cymules mostly scorpioid. **Calyx** with a shallow tube; lobes 5, lanceolate, hairy outside but glabrous inside. **Corolla** with tube very short or longer than lobes; lobes (4)5(–7), imbricate, oblong, spreading or reflexed. **Stamens**: filaments linear, arising in throat of corolla tube, usually exserted; anthers oblong, lobed at base. **Ovary** 2-locular, 2-ovuled or 4-locular with a single ovule at or above middle of each locule; style terminal, flattened, 2-fid with stigmas capitate. **Fruit** subglobose, drupaceous; with 4 1-seeded stones. $x = 13, 8$ (6, 10) (polyploidy).

Species ± 75, in the tropics of both Old and New World, particularly in Africa and Asia, a few in tropical America and West Indies; 3 in sthn Afr., widespread.

Heliotropium L. 7052000

Linnaeus: 140 (1753); Linnaeus: 63 (1754); Candolle: 532 (1845); Bentham: 843 (1876); Boissier: 125 (1879); Gürke: 90 (1897); Wright: 7 (1904); Friedrich-Holzhammer: 1 (1967a); Taton: 28 (1971); Martins: 83 (1990); Al-Shehbaz: 74 (1991); Nowicke & Miller: 29 (1991); Verdcourt: 50 (1991); Riedl: 99 (1997).

Annual or perennial herbs, sometimes subshrubs, rarely shrubs, usually hairy. **Leaves** alternate, rarely subopposite, sessile or petiolate, entire or denticulate. **Flowers** usually small, many, sessile, in unilateral, terminal or pseudoaxillary helicoid cymes with cymes simple or peduncle dichotomously branched to give a pair of cymes or flowers solitary at apices of leafy branches; bracts present or 0. **Calyx** with a short tube; 5-lobed, lobes lanceolate or linear. **Corolla** white, cream, yellow or orange yellow; tube usually cylindric, glabrous or hairy, throat often pubescent; lobes 5, variably shorter than tube, spreading. **Disc** present or 0. **Stamens** arising on corolla tube, included; filaments very short. **Ovary** completely or incompletely 4- or 5-locular with a single, pendulous ovule in each locule; gynobase flat; anthers elliptic-oblong or lanceolate, sometimes pubescent at apices; style terminal, undivided, included; stigma conical at apex, with a broad ring at base of cone. **Fruit** dry or somewhat fleshy, usually with 4 distinct 1-seeded nutlets, or nutlets cohering in pairs or reduced to 1 nutlet by abortion; nutlets with outer surface variable. $x = 13, 8$ (7) (aneuploids, high polyploidy).

Species ± 250, in tropical to warm, temperate regions, particularly in ± arid areas; 20 in sthn Afr., widespread but not recorded from Lesotho and Western Cape.

Lappula Moench 7073000

Moench: 416 (1794); Candolle: 135 (1846); Gürke: 106 (1897); Brand: 136 (1921); Riedl: 68 (1967); Al-Shehbaz: 108 (1991).

Echinospermum Sw. ex Lehm.: 113 (1818).

Annual herbs, rarely biennial. **Leaves** alternate, linear. **Flowers** in terminal, often dichotomously branched, helicoid cymes; small, sessile or pedicellate; pedicels bracteate or upper ones naked, sometimes thickened in fruit. **Calyx** very deeply 5-lobed, lobes linear; accrescent. **Corolla** blue or white; tube funnel- or salver-shaped with 5 scales in throat opposite lobes; lobes 5, oblong-elliptic. **Stamens** arising on corolla tube, included; anthers subsessile. **Ovary** shortly 4-lobed, with a single, laterally attached ovule in each locule; gynobase pyramidal; style gynobasic, short, terete; stigma capitate. **Fruit** of 4 nutlets; nutlets ovoid-trigonous to oblong, with 1 or 2 rows of cylindrical, conical or flattened glochidia, usually attached to receptacle for only

part of their length on the margin. $x = 12$ (11, 23) (aneuploids).

Species ± 50, mainly in temperate Europe and Asia, few in North America and Australia; 1 indigenous in sthn Afr.: *Lappula capensis* (DC.) Gürke, Western and Eastern Cape; **L. squarrosa* (L.) Dumort. subsp. *heteracantha* (Ledeb.) Chater naturalised in Gauteng, Free State, KwaZulu-Natal, Lesotho, and Eastern Cape.

Lithospermum L. 7109000

Linnaeus: 132 (1753); Linnaeus: 64 (1754); Candolle: 73 (1846); Bentham: 860 (1876); Boissier: 216 (1879); Gürke: 118 (1897); Wright: 20 (1904); Riedl: 148 (1967); Taton: 56 (1971); Martins: 108 (1990); Al-Shehbaz: 119 (1991); Verdcourt: 77 (1991).

Perennial, rarely annual or biennial, erect or spreading herbs, undershrubs or shrubs, roughly canescent or hispid. **Leaves** alternate, usually sessile, linear to lanceolate, entire. **Flowers** in leafy terminal or axillary, helicoid cymes. **Calyx** with shallow tube; 5-lobed to more than halfway, lobes linear to lanceolate, usually much shorter than corolla tube. **Corolla** yellow, orange or white; tube subcampanulate with 5 hairy cushions in throat opposite lobes or with 5 folds intruded from outer surface; lobes 5, shorter than tube, imbricate in bud, ovate, obovate or semicircular. **Stamens**: filaments arising near middle of corolla tube, included; anthers longer than filaments. **Disc** a ring of nectaries, lobes or small hairs. **Ovary** 4-lobed, 4-locular, with a solitary ovule in each locule; gynobase disc-like; style gynobasic, filiform, simple or slightly 2-fid, included or exserted; stigmas 2, terminal or situated just below 2-fid apex of style, usually globose. **Fruit** of 4 nutlets; nutlets white, shiny, bony, ovoid or ellipsoid, convex on back, keeled on face. $x = 7$ (8, 6) (aneuploids, high polyploidy).

Species ± 45, mainly in temperate regions of both hemispheres, particularly in Mexico and North America; 9 in sthn Afr, not recorded from Botswana and Western Cape.

Lobostemon Lehm. 7117000

Lehmann: 378 (1830); Candolle: 4 (1846); Bentham: 863 (1876); Gürke: 128 (1897); Wright: 25 (1904); Levyns: 393 (1934).

Subshrubs or shrubs, variably scabrid, hispid or villous, rarely almost glabrous. **Leaves** alternate, sessile, margins entire. **Flowers** in terminal or axillary scorpioid cymes, elongating in fruit, or in pseudospikes; usually with conspicuous bracts. **Calyx** with 5 sepals, divided to base or nearly so, rarely joined for part of their length, similar or dissimilar. **Corolla** blue, ageing pink, cylindric or funnel-shaped, naked in throat, densely hairy scales, ridges or protuberances present at bases of filaments; lobes 5, equal or 2 lobes larger than other 3, erect or spreading. **Stamens** exserted or included; filaments equal or unequal, glabrous; anthers subglobose, obtuse. **Disc** flat or convex. **Ovary** 4-lobed; gynobase disc-like; style simple, gynobasic, hairy or glabrous; stigma minutely bilobed. **Fruit** of 4 nutlets; nutlets ovoid-trigonous or acuminate, rugose-tuberculate to almost smooth. $x = 7$ (polyploidy).

Species 30, endemic in Northern, Western and Eastern Cape.

Myosotis L. 7100000

Linnaeus: 131 (1753); Linnaeus: 63 (1754); Candolle: 104 (1846); Bentham: 858 (1876); Boissier: 234 (1879); Gürke: 118 (1897); Wright: 18 (1904); Stroh: 317 (1942); Riedl: 255 (1967); Grau & Merxmüller: 111 (1972); Al-Shehbaz: 159 (1991); Verdcourt: 86 (1991).

Annual or perennial herbs, usually hairy. **Leaves** alternate, mostly oblong or lanceolate, entire; basal ones shortly petiolate, cauline ones sessile. **Flowers** in simple or dichotomously branched, terminal and axillary scorpioid cymes, cymes lengthening considerably in fruit; bisexual. **Calyx** with a very shallowly campanulate tube; 5-lobed to below middle, lobes linear-lanceolate to oblong; not or slightly enlarging in fruit. **Corolla** white or blue; tube cylindric or campanulate, usually with appendages in throat opposite lobes; 5-lobed to ± halfway. **Stamens** arising in corolla tube, included or exserted; filaments filiform; anthers linear, with connective prolonged into a small trulliform appendage. **Ovary** on disc; deeply 4-lobed with a solitary ovule in each locule; gynobase disc-like; style gynobasic, filiform; stigma obtuse. **Fruit** of 4 nutlets; nutlets erect, oblong-ovoid, glabrous, shiny, fixed by a small basal areole to gynobase. $x = 12$, 11 (8) (aneuploids, high polyploidy).

Species ± 100, cosmopolitan, mostly in the temperate regions of the Old World, particularly Europe and New Zealand but a few in Africa; 7 in South Africa, Lesotho and Swaziland.

***Rochelia** Rchb. 7124000

Reichenbach: 243 (1824); Candolle: 175 (1846); Bentham: 852 (1876); Boissier: 243 (1879); Gürke: 130 (1897); Riedl: 89 (1967); Ferguson: 110 (1972).

Annual, rarely perennial herbs, variously hairy. **Leaves** alternate, rosulate at base, elliptic to oblong. **Flowers** in bracteate, scorpioid cymes, forming lax terminal panicles. **Calyx** lobed to base; lobes 5, linear, accrescent. **Corolla** usually blue; tube cylindrical, usually with 5 scales or invaginations in throat; lobes 5, ovate. **Stamens** included, arising ± in middle of tube. **Ovary** 2-locular; gynobase pyramidal; style gynobasic, included; stigma capitate. **Fruit** of 2 nutlets; nutlets subpyriform, attached to receptacle for most of their length, glochidiate. $x = 10$, 11 (1 report each).

Species ± 20, in Eurasia: 1 in sthn Afr.: **Rochelia disperma* (L.f.) C.Koch from Spain, in Western Cape.

Trichodesma R.Br. 7056000

Brown: 496 (1810) name conserved; Lehmann: 192 (1818); Candolle: 171 (1846); Bentham: 845 (1876); Boissier: 280 (1879); Gürke: 99 (1897); Baker & Wright: 44 (1906); Brand: 19 (1921); Riedl: 219 (1967); Brummitt: 94 (1990); Nowicke & Miller: 24 (1991); Verdcourt: 91 (1991).

Borraginoides Boehm.: 18 (1760). *Pollichia* Medik.: 247 (1783). *Friedrichsthalia* Fenzl: 53 (1839). *Leiocarya* Hochst.: 30 (1844).

Erect, annual or perennial herbs, or subshrubs, variously hairy. **Leaves** with lower ones usually opposite or subopposite, upper ones usually alternate, sessile. **Flowers** pedicellate, in a bracteate, one-sided cyme or in a branching system of ebracteate, very lax cymes. **Calyx** deeply divided into 5 or 6 lobes; lobes ovate to lanceolate, with rounded to cordate bases, apices narrow to cuspidate, often winged; strongly accrescent in fruit. **Corolla** blue or white; tube campanulate to funnel-shaped, throat naked; lobes 5 or 6, ovate-acuminate or broadly triangular, often spreading or reflexed. **Stamens** arising on corolla tube, sessile or with very short, flattened filaments; anthers oblong or linear-lanceolate, with connectives prolonged above, the whole androecium converging above to form a cone with connective prolongations twisted together at apex, connectives with long, shaggy hairs on their dorsal surface. **Ovary** 4-lobed, 4-locular; gynobase pyramidal; style gynobasic or terminal, long and subulate; stigma small, subglobose. **Fruit** of 4 ovoid nutlets, smooth or variously ornamented, or of a single, sessile nutlet; nutlets enclosed in enlarged calyx. $x = 12$, 11.

Species ± 45, mainly in tropical and subtropical regions of Africa to Asia and Australia; 4 in sthn Afr., not recorded from Western Cape.

Wellstedia Balf.f. 7131000

Balfour: 407 (1884); Gürke: 131 (1897); Pilger: 558 (1912); Phillips: 633 (1951); Friedrich-Holzhammer: 121 (1967c) as Wellstediaceae; Hunt: t. 3665 (1969); Thulin & Johanssen: 80 (1996).

Dwarf shrubs, densely, silky hairy with appressed hairs. **Branches** decumbent or ascending. **Leaves** alternate, oblanceolate. **Flowers** in dense, scorpioid cymes or solitary, well-separated, on lax branches; small, regular. **Calyx** deeply 4-lobed. **Corolla** pink or white, with a short, campanulate, membranous, 8-nerved tube, slightly constricted at throat; lobes 4, ovate, ± as long as tube. **Stamens** arising in corolla throat, shorter than corolla lobes; filaments linear; anthers subglobose, ± as long as filaments, with 2 parallel thecae dehiscing introrsely. **Disc** none. **Ovary** bilocular, compressed, densely hairy, with a single ovule in each locule; style terminal, 2-fid at apex; stigmas small, globose. **Fruit** a capsule, loculicidally dehiscent. **Seeds** without endosperm.

Species 4, 3 in Somalia, Socotra and Ethiopia; 1 in sthn Afr.: *Wellstedia dinteri* Pilg., Namibia and northern Namaqualand (Northern Cape).

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Brassicaceae (Cruciferae)

(Dilleniidae—Capparales)

Compiled by L.L. Dreyer & M. Jordaan

Annual, biennial or perennial herbs, suffrutices and shrubs, glabrous or hairy; hairs simple, medifixed, branched, stellate or glandular. **Leaves** mostly alternate, often crowded in a rosette in short-lived herbs, simple, trifoliolate or pinnate, entire or variously lobed or cut, often auriculate; stipules minute or 0. **Inflorescence** usually a terminal, usually bractless raceme, sometimes somewhat corymbose, occasionally a corymbose panicle, rarely intercalary or leaf-opposed, or flowers axillary, solitary. **Flowers** bisexual, usually regular. **Sepals** 4, free, in 2 pairs, equal or unequal, inner (lateral) pair often saccate or spurred at base. **Petals** 4(–0), free, entire, bilobed or fimbriate, usually clawed, sometimes with appendage at base. **Stamens** 6, lateral 2 shorter than median 4 arising in pairs, rarely only 2 or 4 or many; filaments with or without wings or appendages; anthers 2-thecous, opening by longitudinal slits. **Nectaries** at base of filaments variable in number and form. **Ovary** superior, sessile or stipitate, 2-celled or sometimes septum absent and then 1-celled; placentation parietal; ovules in (1)2 rows separated by the septum, generally pendulous, 1–many per locule; style simple, short or long; stigma capitate or bilobed. **Fruit** basically a capsule divided into 2 locules by the persistent septum (replum) to which seeds are attached; referred to as a silicula (short) or siliqua (long), frequently with seed-bearing beak, usually dehiscing by 2 valves falling to reveal septum, rarely indehiscent or transversely articulate; some fruit latiseptate (with a broad septum, because fruit are flattened parallel to the septum), or angustiseptate (with narrow septum because fruit are flattened at right angle to the septum). **Seeds** discoid to globose, often winged, seed coat often mucilaginous; embryo folded double with radicle lying against sides (accumbent) or backs of cotyledons (incumbent); cotyledons linear to circular, variously folded or rolled; endosperm 0 or little.

Genera 390, species ± 3000, cosmopolitan, but mostly in northern, temperate regions, especially the Mediterranean and Middle East; sthn Afr.: genera 34 (20 exotic), species 153 (37 exotic); many of economic importance.

Sonder: 19 (1860); Schulz: 227 (1936); Phillips: 347 (1951); Exell: 190 (1960); Schreiber: 48 (1966); Marais: 1 (1970); Jonsell: 1 (1982); Jonsell: 62 (1993).

Classification of Brassicaceae

[after Schulz (1936), Jonsell (1982) & Takhtajan (1997)]

Tribe **Chamireae** (Fruit a shortly stipitate siliqua; cotyledons persistent, leaf-like, folded longitudinally, with margins deeply folded in again; filaments not appendiculate; hairs absent): *Chamira*

Tribe **Heliophileae** (Fruit a siliqua; cotyledons twice transversely folded; filaments with appendages or papillate at base; hairs absent or simple): *Cycloptychis*, *Heliophila*, *Thlaspeocarpa*

Tribe **Brassiceae** (Fruit usually a siliqua with a distinct, few-seeded to seedless stylar beak, or transversely septate into an upper and lower segment; cotyledons longitudinally folded, spirally or incumbent or accumbent; filaments rarely with appendages; hairs simple or absent): **Brassica*, **Crambe*, **Diplotaxis*, **Eruca*, *Erucastrum*, **Hirschfeldia*,**Raphanus*, **Rapistrum*, **Sinapis*

Tribe **Sisymbrieae** (Fruit a siliqua, rarely a silicula; cotyledons incumbent; filaments linear, not appendiculate; hairs branched, forked or simple): **Arabidopsis*, **Descurainia*, *Sisymbrium*

Tribe **Arabideae** (Fruit a siliqua, very rarely a silicula; cotyledons accumbent, rarely incumbent; filaments linear, not appendiculate, sometimes flattened or thickened at base; hairs branched or simple): *Aplanodes*, **Barbarea*, *Cardamine*, *Rorippa*, **Turritis*

Tribe **Lepidieae** (Fruit a narrowly septate silicula, usually dehiscent; cotyledons incumbent or accumbent; filaments often appendiculate or widened; hairs branched or simple): *Brachycarpaea*, **Camelina*, **Capsella*, **Cardaria*, **Coronopus*, **Hymenolobus*, *Lepidium*, **Thlaspi*

Tribe **Hesperideae** (Fruit a broadly septate, flat or inflated silicula, rarely elongated into a siliqua; cotyledons accumbent; filaments linear or appendiculate; hairs mostly branched: stellate, forked, 2-fid or rarely simple): **Alyssum*, **Lobularia*, **Matthiola*

Tribe **Lunarieae** (Fruit a compressed silicula; cotyledons twice transversely folded; filaments not appendiculate; hairs absent): *Schlechteria*, *Silicularia*

Key to genera

1a Lowermost pair of 'leaves' opposite, sessile, amplexicaul, broader than long, upper leaves alternate or subopposite, petiolate, cordate at base; cotyledons very broad, folded longitudinally and their margins deeply folded in again ..... **Chamira**

1b Lower leaves alternate or opposite, but neither sessile, amplexicaul and broader than long, nor, if opposite, with petiolate, cordate upper leaves; cotyledons narrower, if longitudinally folded, not with margins deeply rolled in:

2a Inflorescences lateral, mostly opposite leaves ..... ***Coronopus**

2b Inflorescences terminal or in leaf axils:

3a Fruit transversely articulate with 2 or more segments which separate at maturity; lower segment indehiscent or whole fruit breaking into 1-seeded portions:

4a Upper segment of fruit cylindrical, oblong-ovoid or ± conical, sometimes constricted between seeds ..... ***Raphanus**

4b Upper segment of fruit globose or ovoid, sometimes beaked:

5a Upper segment not beaked, style absent; flowers white ..... ***Crambe**

5b Upper segment beaked, style persistent; flowers pale yellow, sometimes with red veins ..... ***Rapistrum**

3b Fruit not transversely articulate; siliquae or siliculae opening by valves or breaking into 1-seeded portions, or hard and indehiscent:
6a Fruit at least 4 times as long as broad (including length of style or beak):
7a Hairs simple or absent:
8a Upper stem leaves with clasping auricles:
9a Upper stem leaves not divided; stems round ..... *Brassica
9b Upper stem leaves divided; stems angled ..... *Barbarea
8b Upper stem leaves without clasping auricles:
10a Stem leaves pinnate, pinnatisect, trifoliolate or digitate:
11a Seeds in 2 rows, rarely irregularly in 1 row; flowers white or yellow; fruit subterete, valves with inconspicuous midrib ..... Rorippa
11b Seeds in 1 row; flowers white, mauve, lilac or purple:
12a Valves 1–3(–7)-nerved; leaves pinnately or sub-bipinnately partite ..... Heliophila
12b Valves apparently nerveless; leaves trifoliolate or pinnate with petiolulate leaflets or leaves pinnately lobed ..... Cardamine
10b Stem leaves simple, toothed or lobed to pinnatifid:
13a Petals white, blue, lilac, pink, mauve or purple ..... Heliophila
13b Petals yellow (sometimes white):
14a Seeds in 2 rows in each locule:
15a Beak large, flat, ensiform or lanceolate, never seed-bearing; valves hispid; flowers large, more than 15 mm long, yellow with dark veins ..... *Eruca
15b Style not beak-like, 1.5–2.5 mm long, narrowly cylindrical or ± obconical, sometimes seed-bearing; flowers small, less than 9 mm long, yellow, sometimes tinged with violet when fading ..... *Diplotaxis
14b Seeds in 1 row in each locule:
16a Valves of fruit 1-nerved:
17a Cotyledons incumbent or longitudinally folded around the incumbent radicle; style never beak-like and seed-bearing ..... Sisymbrium
17b Cotyledons always longitudinally folded around the incumbent radicle; style beak-like, often seed-bearing:
18a Fruit ± compressed or subterete, more than 2 mm wide; racemes ebracteate ..... *Brassica
18b Fruit ± quadrangular, less than 2 mm wide; racemes often bracteate, at least in lower part ..... Erucastrum
16b Valves of fruit 3- or more-nerved:
19a Fruit appressed, less than 1.5 mm in diam., valves 3-nerved, the nerves obscure in ripe fruit; seeds oblong to ovoid ..... *Hirschfeldia
19b Fruit spreading, more than 2.5 mm in diam., valves 3–5-nerved; seeds globose ..... *Sinapis
7b Hairs stellate, branched or a mixture of simple and branched hairs:
20a Plants glandular; petals longer than 10 mm; stigma deeply 2-lobed, lobes erect, each frequently with a dorsal swelling or horn ..... *Matthiola
20b Plants not glandular; petals shorter than 10 mm:
21a Stem leaves amplexicaul ..... *Turritis
21b Stem leaves not amplexicaul:
22a Upper stem leaves finely divided ..... *Descurainia
22b Upper stem leaves simple, entire or dentate:
23a Basal leaves in a rosette; stem leaves sessile; slender, small, annual or biennial herbs up to 300 mm tall ..... *Arabidopsis
23b Basal leaves not in a rosette; stem leaves petiolate; perennial herbs, up to 800 mm tall ..... Aplanodes
6b Fruit less than 3.5 times as long as broad:
24a Fruit angustiseptate (septum narrow because fruit is flattened at right angles to the septum):
25a Ovules 1–4; cotyledons narrow, linear:
26a Fruit indehiscent; stem leaves sagittate, amplexicaul; inflorescence a corymbose panicle ..... *Cardaria
26b Fruit breaking into two 1-seeded portions or valves falling away from the seeds; stem leaves not amplexicaul; inflorescences racemes:
27a Glabrous, perennial subshrubs, virgate, erect or procumbent; all leaves entire; flowers large, petals 8–20 mm long; valves of silicula papillose to rugose ..... Brachycarpaea
27b Glabrous herbs or shrublets; leaves variable; flowers small, petals 1–3 mm long; valves smooth ..... Lepidium
25b Ovules 6–24; cotyledons broad, elliptic to circular:
28a Upper stem leaves cuneate; plant glabrous or sparsely puberulous with simple hairs; fruit ellipsoid to obovoid, 2–3(5) mm long ..... *Hymenolobus
28b Upper stem leaves sagittate-amplexicaul; plants glabrous or with simple and branched hairs:
29a Fruit obovate-circular, 10–15 mm long, broadly winged all around, but wings broadest apically ..... *Thlaspi
29b Fruit obcordate-triangular, 6–9 mm long, 4–8 mm broad, emarginate, lateral margins almost straight ..... *Capsella
24b Fruit latiseptate (septum broad, fruit flattened parallel to the septum):
30a Plants with stellate, branched or medifixed hairs, sometimes mixed with simple hairs:
31a Stem leaves sagittate-amplexicaul ..... *Camelina

31b Stem leaves not sagittate-amplexicaul:
32a Plants with stellate hairs; flowers yellow; petals linear-oblong, broadly clawed, densely pubescent on back; each filament with wing-like appendage; sepals persistent whilst fruits mature ..... ***Alyssum**
32b Plants with medifixed hairs; flowers white or pinkish; petals with a circular blade, clawed, glabrous; filaments without appendages; sepals patent ..... ***Lobularia**
30b Plants with simple hairs or completely glabrous:
33a Annual or perennial herbs:
34a Fruit a siliqua, erect; seeds in 2 rows; valves with an indistinct midrib, appearing veinless..... **Rorippa**
34b Fruits subcircular, compressed, discoid, pendulous, 1-seeded; valves 1-nerved..... **Thlaspeocarpa**
33b Perennial woody shrublets, glabrous:
35a Petals mauve to purple; sepals 3-nerved; fruit dehiscent ..... **Cycloptychis**
35b Petals white or pale pink; fruit indehiscent:
36a Fruit erect, valves woody, margins thickened..... **Silicularia**
36b Fruit pendulous, compressed, valves membranous..... **Schlechteria**

*Alyssum L. 3006000

Linnaeus: 650 (1753); Linnaeus: 293 (1754); Sonder: 23 (1860); Schulz: 490 (1936); Phillips: 352 (1951); Ball: 297 (1964); Marais: 99 (1970).

Annual or perennial herbs or subshrubs; vegetative parts generally densely stellately hairy. **Leaves** simple, entire or dentate. **Inflorescence** dense, racemose or paniculate. **Sepals** erect-spreading, not saccate. **Petals** entire or emarginate, clawed, yellow. **Stamens** 6; all or only some filaments with appendages. **Nectaries** 4, on either side of each short filament, triangular or filiform. **Fruit** a circular, ovate or obovate silicula; valves flat or eventually inflated, faintly net-veined, glabrous or hairy. **Seeds** 2–16, flattened, mostly narrowly winged; cotyledons accumbent. $x = 8$ (aneuploids, high polyploidy).

Species ± 168, mostly Mediterranean, some in central Europe and Asia; 1 in sthn Afr.: **Alyssum minutum* Schltdl. ex DC., naturalised in Namaqualand and the Western Cape.

Aplanodes Marais 2875010

Marais: 111 (1966); Marais: 102 (1970).

Perennial herbs with irregularly branched hairs. **Leaves** ovate, petiolate, lower ones cordate at base or pinnatifid with short, spreading lobes. **Inflorescence** racemose, terminal. **Sepals** spreading, inner 2 slightly saccate. **Petals** obovate, clawed, slightly emarginate, white to purple. **Filaments** flattened or thickened at base. **Nectaries** present, lateral ones ring-shaped, closing around bases of short filaments, uniting into ring with ribbon-shaped median nectaries outside long filaments. **Ovary** sessile; ovules 6–18 per locule; stigma capitate, very shallowly 2-lobed. **Fruit** a linear siliqua; valves flat, 1-nerved, net-veined, acute. **Seeds** in 1 row, broadly oval, winged; cotyledons accumbent.

Species 2, restricted to sthn Afr.: *Aplanodes doidgeana* Marais, KwaZulu-Natal; and *A. sisymbrioides* (Schltr.) Marais, Lesotho and Eastern Cape.

*Arabidopsis Heynh. 2999000

Heynhold: 538 (1842) name conserved; Schulz: 640 (1936); Phillips: 352 (1951); Ball: 267 (1964a); Marais: 117 (1970); Jonsell: 43 (1982); O'Kane & Al-Shehbaz: 323 (1997).

Cardaminopsis (C.A.Mcy.) Hayek: 477 (1908).

Slender, annual or biennial herbs, with simple and branched hairs; up to 300 mm tall. **Leaves** simple, entire or dentate. **Inflorescences** simple, terminal, sometimes bracteate racemes. **Sepals** erect, not or hardly saccate at base. **Petals** clawed, mostly white. **Stamens** 6 or 4; filaments without appendages. **Nectaries** united into a ring. **Ovary** narrowly cylindrical; ovules many; stigma almost sessile. **Fruit** a linear siliqua; valves thin, rounded on back, 1-nerved. **Seeds** ellipsoid, not mucilaginous, mostly in 1 row; cotyledons incumbent. $x = 2$ (polyploidy).

Species 13, Asia, Europe and North America; 1 in sthn Afr.: **Arabidopsis thaliana* (L.) Heynh., introduced to Northern, Western and Eastern Cape.

*Barbarea R.Br. 2961000

Brown: 109 (1812) name conserved; Sonder: 22 (1860); Schulz: 537 (1936); Adamson: 422 (1950); Phillips: 350 (1951); Ball: 281 (1964); Marais: 104 (1970); Jonsell: 51 (1982).

Biennial or perennial herbs with a taproot and angular stems, glabrous or sparsely set with simple hairs. **Leaves** in basal rosette, lyrate-pinnatifid, petiolate; stem leaves sessile, auriculate-amplexicaul. **Inflorescences** dense racemes. **Sepals** erect, spreading, inner two saccate. **Petals** clawed, yellow. **Stamens** 6; filaments without appendages. **Nectaries** 4, those at base of short filaments horseshoe-shaped, opening outwards, rarely divided into 2; glands between long filaments erect, ± conical. **Fruit** a linear, subterete-quadrangular siliqua; valves strongly 1-nerved, net-veined. **Seeds** in one row; cotyledons accumbent. $x = 8$ (aneuploids).

Species 12, Europe, North America and N Asia; 1 in sthn Afr.: **Barbarea verna* (Mill.) Aschers., introduced to Western Cape.

Brachycarpaea DC. 2877000

Candolle: 247 (1821a); Candolle: 698 (1821b); Candolle: 235 (1824); Sonder: 33 (1860); Schulz: 406 (1936); Adamson: 419 (1950); Phillips: 347 (1951); Compton: 149 (1953); Marais: 82 (1970).

Glabrous, perennial subshrubs, erect and virgate or procumbent. **Leaves** linear to oblong, entire, sessile, acute. **Inflorescences** terminal, ebracteate racemes. **Sepals** erect, persistent, inner 2 saccate at base. **Petals** oblanceolate to obovate, clawed. **Stamens** 6; filaments without appendages; anthers apiculate. **Nectaries** small, 2 on either side of each short filament. **Ovary** subcircular in outline, compressed, sessile, 2-locular; ovules solitary, pendulous. **Fruit** an angustiseptate, didymous, indehiscent silicula, breaking into 1-seeded locules; valves ± spherical, keeled, hard, woody, papillose to rugose; style cylindrical, stout. **Seeds** with coiled cotyledons.

Species 1, sthn Afr.: *Brachycarpaea juncea* (P.J.Bergius) Marais, Western and Eastern Cape.

*Brassica L. 2949000

Linnaeus: 666 (1753); Linnaeus: 299 (1754); Schulz: 21(1919); Schulz: 321 (1936); Adamson: 409 (1950); Phillips: 350 (1951); Exell: 186 (1960); Heywood: 335 (1964); Marais: 5 (1970); Jonsell: 3 (1982); Jonsell: 64 (1993).

Annual, biennial or perennial herbs, glabrous or with simple hairs, frequently glaucous. **Leaves** with lower ones lyrate-pinnatifid or sometimes only dentate or sinu-

ate; upper leaves usually entire, often sessile and amplexicaul. **Inflorescences** terminal, ebracteate racemes. **Sepals** erect or spreading, inner somewhat saccate. **Petals** clawed, yellow, rarely white. **Stamens** 6; filaments without appendages. **Nectaries** 4; one ± kidney-shaped gland inside each short filament and an erect, ± conical or tongue-shaped gland in front of each pair of long filaments. **Fruit** a narrowly or broadly linear siliqua, terete or ± compressed; valves rather thick, rounded on back, 1-nerved; beak usually prominent, with 1–3 seeds. **Seeds** in one row, subglobose, reticulate; cotyledons emarginate, longitudinally folding around incumbent radicle. $x = 9, 10$ (7, 8, 11, 12, 17, 19) (polyploidy).

Species ± 40, mainly Eurasia; 5 in sthn Afr., introduced and widely naturalised.

*Camelina Crantz 2987000

Crantz: 17 (1762); Clapham, Tutin & Warburg: 184 (1952); Meikle: 315 (1964); Marais: 1 (1970); Jonsell: 68 (1982); Rich: 37 (1991).

Annual or biennial herbs with taproots and simple, branched or stellate hairs; stems erect, branched above. **Leaves**: basal ones sessile, simple; leaves on stems sagittate-amplexicaul; upper stem leaves smaller. **Inflorescences** terminal, crowded, ebracteate racemes. **Sepals** erect. **Petals** spathulate, yellow or whitish. **Stamens** 6, without appendages; anthers ovoid, obtuse, yellow. **Nectaries** at each side of bases of lateral stamens. **Ovary** pyriform, with very short gynophore; ovules 8–24; style distinct; stigma capitate. **Fruit** a dehiscent, obovoid or obovoid-pyriform silicula; valves convex or inflated, with a strong midrib vanishing above. **Seeds** many, ellipsoid, pale brown, biseriate; cotyledons incumbent. $x = 8$ (aneuploids, polyploidy).

Species ± 10, natives of central Europe, eastern Mediterranean and central Asia but widely spread by man. Cultivated for fibre, seeds for cagebirds and for seed oil (cameline oil). Weed in flax and grain fields in Europe; only twice recorded from South Africa in Gauteng.

*Capsella Medik. 2986000

Medikus: 85 (1792) name conserved; Sonder: 31 (1860); Schulz: 453 (1936); Adamson: 421 (1950); Phillips: 351 (1951); Exell: 192 (1960); Chater: 316 (1964); Marais: 97 (1970); Jonsell: 27 (1982).

Annual or biennial herbs with simple and branched hairs. **Leaves** basally pinnatipartite to entire; stem leaves sessile, amplexicaul. **Inflorescences** ebracteate racemes. **Sepals** spreading, not saccate. **Petals** 4 or 0, white, pink or yellowish, shortly clawed. **Stamens** 6; filaments without appendages; anthers ovoid, obtuse. **Nectaries** semicircular glands, one on either side of each short filament. **Ovary** dorsiventrally flattened, obovate, ovules 12–24 per locule. **Fruit** an angustiseptate, obcordate silicula; valves keeled, net-veined. **Seeds** ellipsoid, not winged; cotyledons incumbent. $x = 8$.

Species 5, eastern Mediterranean and W Asia; 1 in sthn Afr.: **Capsella bursa-pastoris* (L.) Medik., naturalised, widespread.

Cardamine L. 2966000

Linnaeus: 654 (1753); Linnaeus: 295 (1754); Sonder: 23 (1860); Schulz: 280 (1903); Schulz: 527 (1936); Adamson: 422 (1950); Phillips: 351 (1951); Exell: 189 (1960); Jones: 285 (1964); Marais: 100 (1970); Jonsell: 38 (1982); Hilliard & Burtt: 275 (1982); Marhold: 397 (1995).

Annual or perennial herbs, glabrous or with simple hairs. **Leaves** pinnate, trifoliolate or more rarely simple. **Inflorescences** terminal, ebracteate racemes. **Sepals** erect, spreading, not or hardly saccate. **Petals** obovate, rounded or emarginate, clawed, white, mauve, lilac or purple. **Stamens** 4 or 6; filaments without appendages. **Nectaries** at base of short filaments ring-shaped, closed or open on inner side; median nectaries small or absent. **Fruit** a linear or linear-lanceolate siliqua; valves flat; midrib immersed, obscure; valves opening suddenly and coiling spirally from base. **Seeds** flattened, broadly elliptic to oblong, in 1 row; cotyledons accumbent. $x = 8$ (aneuploids, high polyploidy).

Species 130, cosmopolitan; sthn Afr., 2 natural: *Cardamine africana* L. (widespread) and *C. trichocarpa* Hochst. ex A.Rich. (restricted to KwaZulu-Natal); 3 introduced and naturalised: **C. flexuosa* With. (KwaZulu-Natal), **C. hirsuta* L. (widespread) and **C. impatiens* L. (widespread).

*Cardaria Desv. 2883010

Desvaux: 163 (1814); Schulz: 415 (1936); Ball: 333 (1964); Marais: 96 (1970).

Perennial herbs with creeping rootstock; stems several, densely leafy; hairs simple. **Leaves** with lower ones petiolate, lobed; stem leaves sessile, sagittate, amplexicaul. **Inflorescence** an ebracteate, corymbose panicle. **Sepals** spreading, not saccate. **Petals** clawed, white. **Stamens** 6; filaments without appendages. **Nectaries** 6, 2 median glands triangular, lateral ones semicircular. **Ovary** with 2–4 ovules. **Fruit** a broadly ovate to obcordate silicula, indehiscent, 2(1)-seeded. **Seeds** ovoid or ellipsoid; cotyledons incumbent. $x = 8$ (aneuploids, polyploidy).

Species 1, Mediterranean; 1 in sthn Afr.: **Cardaria draba* (L.) Desv., naturalised.

Chamira Thunb. 2880000

Thunberg: 48 (1782); Sonder: 32 (1860); Schulz: 319 (1936); Adamson: 408 (1950); Phillips: 348 (1951); Marais: 5 (1970).

Annual herbs, succulent, glabrous; cotyledons persistent, leaf-like, green, sessile. **Leaves** petiolate, cordate at base. **Inflorescences** ebracteate racemes. **Sepals**: lateral ones spurred. **Petals** narrowly obovate, long-clawed, white. **Stamens** 6; filaments without appendages. **Nectaries** present, lateral ones large, ± tongue-shaped. **Ovary** shortly stipitate, 2-locular with 2–4 ovules in each locule. **Fruit** a broadly lanceolate or oblanceolate, shortly stipitate siliqua; valves membranous, weakly veined. **Seeds** ± ovoid but flattened at hilum end, papillate; cotyledons very broad, folded longitudinally, with margins deeply folded in again.

Monotypic: *Chamira circaeoides* (L.f.) A.Zahlbr., endemic to Western Cape.

*Coronopus Zinn 2884000

Zinn: 325 (1757) name conserved; Schulz: 410 (1936); Adamson: 420 (1950); Phillips: 348 (1951); Exell: 193 (1960); Ball: 333 (1964); Schreiber: 48 (1966); Marais: 94 (1970); Jonsell: 23 (1982).

Senebiera DC.: 140 (1799); Sonder: 27 (1860).

Annual, biennial or perennial herbs with a taproot, glabrous or with simple hairs; stems leafy. **Leaves** pinnatifid or entire. **Inflorescences**: lateral racemes becoming overtopped by lateral growth, mostly opposite leaves. **Sepals** spreading, not saccate. **Petals** 4 or 0, white, yellowish or purplish. **Stamens** 2, 4 or 6; filaments without appendages. **Nectaries** 6, small, 2 median, 4 lateral. **Ovary** flat; ovules 2 per locule; style short or rudimentary. **Fruit** an angustiseptate silicula, reniform or with 2 globose halves, dorsally compressed, indehiscent or breaking into 2 halves, 2-seeded. **Seeds** ovoid-ellipsoid; cotyledons incumbent. $x = 8$ (polyploidy).

Species 10, Mediterranean, southeast Africa and South America, but now almost cosmopolitan; 3 in sthn Afr., naturalised, widespread.

*Crambe L. 2958000

Linnaeus: 671 (1753); Linnaeus: 301 (1754); Schulz: 228 (1919); Ball: 344 (1964); Marais: 15 (1970); Jonsell: 15 (1982).

Annual or perennial herbs or suffrutices, glabrous or with simple hairs. **Leaves** with lower ones pinnatisect, rarely entire; upper leaves small, linear. **Inflorescence** branched, racemose. **Sepals** erect, spreading, inner two slightly saccate. **Petals** shortly clawed or cuneate, white or pale yellow. **Stamens** 6; long filaments 4, usually with tooth-like appendages. **Nectaries** with lateral ones semilunar; median ones ± conical. **Fruit** a transversely articulate silicula on gynophore; lower segment short, sterile, stalk-like; upper segment ovoid to globose, hard, indehiscent, 1-seeded; stigma sessile. **Seeds** faintly sculptured or smooth, spheroid; cotyledons folded around incumbent radicle. $x = 10$ (polyploidy).

Species 20, W Asia, central Europe, the Mediterranean region, northern tropical Africa; 1 in sthn Afr.: **Crambe hispanica* L. introduced and restricted to KwaZulu-Natal.

Cycloptychis E.Mey. ex Sond. 2878000

Sonder: 34 (1860); Schulz: 400 (1936); Phillips: 347 (1951); Marais: 80 (1970).

Glabrous, virgate, woody shrubs or shrublets. **Leaves** linear, oblong to oblanceolate, entire. **Inflorescences** terminal, lax racemes. **Sepals** erect, 3-nerved, inner 2 saccate or not. **Petals** oblanceolate-spatulate, long-clawed, pale mauve to purple. **Stamens**: filaments subulate; anthers minutely apiculate. **Nectaries** 2, 1 outside each short filament. **Ovary** elliptic, oval or oblong, compressed, 2-locular; ovules solitary; style short or long, stout; stigma small. **Fruit** an elliptical to subcircular, beaked silicula; valves falling away enclosing seeds, or seeds falling free; valves weakly or strongly keeled and ridged. **Seeds** compressed and winged or shaped like a button mushroom; cotyledons twice transversely folded.

Species 2: *Cycloptychis virgata* (Thunb.) E.Mey. ex Sond. and *C. marlothii* O.E.Schulz, endemic to Western Cape.

*Descurainia Webb & Berthel. 2997000

Webb & Berthelot: 72 (1836); Schulz: 649 (1936); Ball: 266 (1964); Marais: 117 (1970).

Mostly annual, branched herbs, with branched, stellate, glandular or simple hairs. **Leaves** 2- or 3-pinnatisect. **Inflorescences** racemose, many-flowered, ebracteate. **Flowers** small, inconspicuous. **Sepals** erect, not saccate. **Petals** yellowish, usually smaller than sepals. **Stamens** 6; filaments without appendages. **Nectaries** narrow, lateral ones horseshoe-shaped, united with median ones. **Fruit** a short, linear siliqua; valves rounded, 1-nerved, net-veined; style very short; stigma capitate. **Seeds** elliptic or oblong, in 1 or 2 rows, small; cotyledons incumbent. $x = 7$ (aneuploids, polyploidy).

Species ± 55, mostly North America, some from South America, Europe and Asia; 1 in sthn Afr.: **Descurainia sophia* (L.) Webb ex Prantl, naturalised in arid areas, only few times recorded in Gauteng, Northern and Eastern Cape.

*Diplotaxis DC. 2946000

Candolle: 628 (1821b); Candolle: 221 (1824); Schulz: 342 (1936); Phillips: 349 (1951); Heywood: 334 (1964); Marais: 12 (1970); Rich: 102 (1991); Jonsell: 64 (1993).

Annual or perennial herbs, sometimes woody at base, with simple hairs. **Leaves** petiolate; basally usually rosulate, pinnatisect or pinnatifid; stem leaves few, sessile, usually cuneate. **Inflorescences** terminal, many-flowered racemes. **Sepals** erect, spreading, equal or inner pair slightly saccate. **Petals** obovate, clawed, yellow. **Stamens** 6; filaments without appendages. **Nectaries** at base of long stamens shortly ligulate. **Fruit** a linear or linear-lanceolate siliqua, compressed, dehiscent with short, seedless beak; valves 1-nerved, flat; stigma shallowly 2-lobed. **Seeds** many, in 2 rows, ovoid; cotyledons longitudinally folded around incumbent radicle. $x = 7, 9, 10, 11, 13$ (polyploidy).

Species ± 27, Mediterranean and central Europe, some extending eastwards into India; 1 in sthn Afr.: **Diplotaxis muralis* (L.) DC., introduced and widely naturalised.

*Eruca Mill. 2944000

Miller: [472] (1754); Schulz: 344 (1936); Phillips: 349 (1951); Exell: 186 (1960); Tutin: 340 (1964); Marais: 12 (1970).

Annual or perennial herbs, with simple hairs. **Leaves** lyrate-pinnatifid. **Inflorescences** ebracteate racemes. **Flowers** large. **Sepals** erect, inner two slightly saccate. **Petals** obovate, long-clawed, whitish, yellow or lilac with dark veins. **Stamens** 6; filaments without appendages. **Nectaries** 6, small. **Fruit** a short, oblong or ellipsoid siliqua; valves 1-nerved; beak broad, flat, seedless. **Seeds** spherical or ovoid, in 2 rows; cotyledons folded longitudinally around incumbent radicle. $x = 11$.

Species 5, native to the Mediterranean region; 1 in sthn Afr.: **Eruca sativa* Mill., naturalised in the northern summer-rainfall regions.

Erucastrum (DC.) C.Presl 2947000

Candolle: 582, 598 (1821b) as *Brassica* L. sect. *Erucastrum* DC.; Presl: 92 (1826) as *Erucastrum*; Sonder: 31 (1860), under *Brassica*; Schulz: 88 (1919); Schulz: 331 (1936); Phillips: 350 (1951); Exell: 189 (1960); Tutin: 340 (1964); Marais: 7 (1970); Jonsell: 9 (1982); Jonsell: 64 (1993); López: 67 (1999).

Annual, biennial or perennial herbs with simple hairs. **Leaves** basally lyrate-pinnatifid; upper leaves usually sessile. **Inflorescences** often bracteate racemes. **Sepals** erect or spreading, inner two ± saccate. **Petals** clawed, yellow. **Stamens** 6; filaments without appendages. **Nectaries** semicircular or 2-lobed, median ones ± tongue-shaped. **Ovary** cylindrical; ovules 10–50; style short; stigma semiglobose to 2-fid. **Fruit** a siliqua, readily dehiscent, subterete, ± quadrangular, ± torulose; valves keeled, 1-nerved, reticulately veined; beak conical, 0–3-seeded. **Seeds** ovoid or oblong, in 1 row; cotyledons folded longitudinally around incumbent radicle. $x = 7, 8, 9$ (polyploidy).

Species ± 18, central and southern Europe, Africa, Arabian Peninsula; 3 in sthn Afr., widespread.

Heliophila L. 2875000

Linnaeus: 926 (1763); Sonder: 35 (1860); Schulz: 31 (1931); Schreiber 48: 4 (1966); Marais: 17 (1970).

Carponema (DC.) Eckl. & Zeyh.: 8 (1834–1835); Sonder: 35 (1860); Adamson: 418 (1950); Phillips: 347 (1951); Marais: 17 (1970).

Annual or perennial herbs or shrubs, rarely scandent or climbing, glabrous or with simple hairs. **Leaves** narrow or broad, simple, entire or variously dentate or lobed or pinnately or sub-bipinnately partite; stipules 0 or 2, minute. **Inflorescence** usually racemose, sometimes flowers axillary or few together on short side branches, or intercalary; pedicels sometimes subtended by 2 minute bracts. **Sepals** caducous or subpersistent, outer 2 often cucullate, sometimes horned or thickened at apex, inner 2 saccate at base or not. **Petals** lanceolate to subcircular, generally clawed, with (0)1(2) appendages at base, or papillate, white, blue, lilac, mauve, purple or pink. **Stamens** 6; none, all, or only 2 short filaments with appendages or papillate at base. **Nectaries** 2, semicircular, horseshoe-shaped or biprismatic, outside lateral (short)

filaments. **Fruit** a siliqua, dehiscent, short or long, linear to obovate-circular, with straight margins or deeply constricted between seeds, terete or dorsally compressed, latiseptate, sessile or stipitate; valves flat or bulged by seeds, 1–7-nerved, glabrous or hairy, smooth, papillate or somewhat warted; style short or long, slender or stout, much swollen in fruit. **Seeds** generally in 1 row, few to many, flattened, ovoid or globose, immarginate or winged, smooth or papillose; cotyledons twice transversely folded. $x = 10$.

Species 75, endemic to sthn Afr., mostly from winter-rainfall areas of Northern, Western and Eastern Cape, but a few widely distributed.

*Hirschfeldia Moench 2947010

Moench: 264 (1794); Schulz: 339 (1936); Tutin: 342 (1964); Marais: 11 (1970).

Annual or biennial herbs; stems leafy, with simple hairs. **Leaves** usually lyrate-pinnatifid. **Inflorescences** terminal, ebracteate racemes. **Sepals** erect, spreading, inner two slightly saccate. **Petals** small, obovate, clawed, yellow or white. **Stamens** 6; filaments without appendages. **Nectaries** 6, small. **Fruit** a short, appressed siliqua; valves 3-nerved when young, nerves obscured when ripe; beak thick, 1- or 2-seeded. **Seeds** in 1 row, ovoid, brown; cotyledons folded longitudinally around incumbent radicle. $x = 7$.

Species 2, Mediterranean and Socotra; 1 in sthn Afr.: **Hirschfeldia incana* (L.) Lagr.-Foss., introduced and recorded as rare escape in Western Cape.

*Hymenolobus Nutt. 2985000

Nuttall: 117 (1838); Schulz: 457 (1936); Heywood: 317 (1964); Marais: 98 (1970).

Small, annual herbs, with simple hairs. **Leaves** pinnatifid, upper ones entire. **Inflorescences** many-flowered, ebracteate racemes. **Sepals** spreading, not saccate. **Petals** spatulate, clawed, white. **Stamens** 4 or 6; filaments simple. **Nectaries** 4, small. **Fruit** an angustiseptate silicula, ellipsoid to oblong-ovoid. **Seeds** 3–10 per locule, ovoid, small; cotyledons incumbent. $x = 6$.

Species 5, Europe, Mediterranean region, central Asia, Australia, North America, Chile; 1 in sthn Afr.: **Hymenolobus procumbens* (L.) Nutt. ex Schinz & Thell., introduced and recorded as rare escape in Western Cape.

Lepidium L. 2883000

Linnaeus: 643 (1753); Linnaeus: 291 (1754); Sonder: 28 (1860); Schulz: 407 (1936); Adamson: 419 (1950); Phillips: 348 (1951); Exell: 190 (1960); De Carvalho e Vasconcellos: 330 (1964); Schreiber: 48 (1966); Marais: 83 (1970); Jonsell: 20 (1975); Jonsell: 17 (1982).

Annual, biennial or perennial herbs or shrublets, glabrous or pubescent, with simple hairs. **Leaves** variable, simple to 1–4-pinnatipartite, sessile or petiolate, cuneate or amplexicaul, margins entire to serrate-dentate or lobate; basal leaves usually rosulate and differing in shape from cauline leaves. **Inflorescences** terminal or axillary racemes, corymbose at first, contracting or elongating in fruit, dense or lax. **Flowers** minute; pedicels appressed or wide-spreading. **Sepals** equal, not saccate at base, deciduous or persistent. **Petals** present or 0, often much reduced. **Stamens** 2–6; filaments long; anthers exserted. **Nectaries** tuberculate or elongate, filiform. **Fruit** a silicula, dehiscent, dorsally compressed, oblong, ovate, obovate, elliptical, obcordate or subcircular, angustiseptate, 2-valved, emarginate at apex and style included in sinus, or not (or hardly) emarginate with style exserted; valves boat-shaped, keeled or winged, falling away empty and seeds falling free. **Seeds** 1(2) per locule, pendulous, finely reticulate, mucilaginous, elliptic to obovate, sometimes narrowly winged; cotyledons incumbent, sometimes oblique, entire or tripartite. $x = 4, 8$ (aneuploids, high polyploidy).

Species ± 150, cosmopolitan in temperate and subtropical regions of the world; 17 (2 introduced) in sthn Afr., widespread.

*Lobularia Desv. 3013000

Desvaux: 162 (1814); Schulz: 494 (1936); Ball: 307 (1964); Marais: 99 (1970).

Under *Alyssum* L.; Sonder: 24 (1860); Adamson: 421 (1950).

Annual to perennial herbs, with appressed, medifixed hairs. **Leaves** narrow, entire. **Inflorescences** terminal racemes, dense in flower, elongate in fruit. **Sepals** spreading, not saccate at base. **Petals** clawed, entire, white or pinkish. **Stamens** 6; filaments without appendages. **Ovary** with 2–10 ovules. **Fruit** a circular or ovate, compressed silicula; valves flat or ± inflated, faintly reticulately veined. **Seeds** compressed, narrowly winged; cotyledons accumbent. $x = 6$ (aneuploids, polyploidy).

Species 5, Cape Verde, Canary Islands and Mediterranean region; 1 in sthn Afr.: **Lobularia maritima* (L.) Desv., an escape in Western Cape.

*Matthiola R.Br. 3042000

Brown: 119 (1812) name conserved; Sonder: 20 (1860); Schulz: 562 (1936); Adamson: 424 (1950); Phillips: 353 (1951); Ball: 279 (1964a); Schreiber: 48 (1966); Marais: 109 (1970); Jonsell: 62 (1982); Jonsell: 72 (1993).

Annual herbs or perennial shrublets, grey-tomentose with branched and sometimes glandular hairs. **Leaves** entire, sinuate-dentate or pinnatifid. **Inflorescences** terminal, lax racemes. **Sepals** erect, 2 inner ones saccate at base. **Petals** long-clawed, pink-purple, white or brownish yellow. **Stamens** 6; long filaments sometimes dilated, without appendages. **Nectaries** 4, semicircular, one on either side of each short filament. **Fruit** a siliqua on short, stout pedicels, linear, terete; valves 1-nerved, hairy; style very short or absent; stigma 2-lobed, lobes erect, each with dorsal swelling or horn. **Seeds** in one row, compressed, often winged; cotyledons accumbent. $x = 6, 7$ (aneuploids).

Species 55, Macaronesia, western Europe, Mediterranean; 3 in sthn Afr., recorded in the drier parts as introduced species and garden escapes: Namibia, North-West, Free State, Lesotho, Northern, Western and Eastern Cape.

*Raphanus L. 2950000

Linnaeus: 669 (1753); Linnaeus: 300 (1754); Schulz: 194 (1919); Phillips: 350 (1951); Exell: 193 (1960); Chater: 345 (1964); Marais: 14 (1970); Jonsell: 11 (1982).

Annual, biennial or short-lived perennial herbs, with simple hairs. **Leaves** basally lyrate-pinnatifid; upper leaves small. **Inflorescences** terminal, ebracteate racemes. **Sepals** erect, inner two saccate. **Petals** long-clawed, white, purple or yellow, generally dark-veined. **Stamens** 6; filaments without appendages. **Nectaries** 6; 2 median glands tongue-shaped; 4 lateral glands small. **Fruit** a transversely articulate siliqua; lower segment small, sterile, stalk-like; upper segment terete, straight-sided or moniliform, ribbed, indehiscent, breaking into 1-seeded portions or not; beak thin, seedless. **Seeds** ovoid, brown; cotyledons folded longitudinally around incumbent radicle. $x = 9$.

Species ± 8, western and central Europe; 2 in sthn Afr.: **Raphanus raphanistrum* L. and **R. sativus* L., naturalised, widespread.

*Rapistrum Crantz 2956000

Crantz: 105 (1769); De Carvalho e Vasconcellos: 343 (1964); Marais: 16 (1970).

Annual or perennial herbs; stems hispid with simple hairs. **Leaves** pinnatisect or pinnatifid. **Inflorescences**

terminal, ebracteate racemes. **Sepals** erect-spreading, inner 2 saccate. **Petals** shortly clawed, yellow. **Stamens** 6; filaments without appendages. **Nectaries** 6; median 2 tongue-shaped; lateral 4 small, flat. **Fruit** a transversely articulate siliqua; valvar portion 0–2-seeded, cylindrical, ellipsoid, or obconical; stylar portion ovoid to globose, wider than the lower portion, 1-seeded, indehiscent; beak conical or filiform. **Seeds** ovoid, smooth; cotyledons longitudinally folded around incumbent radicle. x = 8 (aneuploids).

Species 3, central Europe, Mediterranean region and W Asia; 1 in sthn Afr.: **Rapistrum rugosum* (L.) All., naturalised in North-West, KwaZulu-Natal, Northern, Western and Eastern Cape.

Rorippa Scop. 2965000

Scopoli: 520 (1760); Schulz: 522 (1936); Exell: 182 (1960); Valentine: 283 (1964); Schreiber: 48 (1966); Marais: 105 (1970); Jonsell: 52 (1982).

Nasturtium R.Br.: 109 (1812); Sonder: 21 (1860); Adamson: 422 (1950); Phillips: 351 (1951).

Annual to perennial herbs, glabrous or with simple hairs. **Leaves** entire, simple or pinnate. **Inflorescences** terminal or axillary, ebracteate racemes. **Sepals** spreading, not or hardly saccate at base. **Petals** white or yellow. **Stamens** normally 6; filaments without appendages. **Nectaries** ± surrounding lateral filament-bases, usually also extending outside median ones or lacking. **Fruit** a siliqua or a silicula; valves rounded on back, midrib inconspicuous or absent; stigma 2-lobed. **Seeds** ± in 2 rows, ellipsoid to spheroid, yellow to dark brown, wingless; cotyledons accumbent. x = 8 (aneuploids, polyploidy).

Species ± 80; fairly cosmopolitan, chiefly in temperate regions; 5 in sthn Afr., widespread.

Schlechteria Bolus 3008000

Bolus: 455 (1898); Schulz: 484 (1936); Phillips: 353 (1951); Compton: 152 (1953); Marais: 77 (1970).

Glabrous, much-branched, woody shrublets. **Leaves** linear, alternate, sessile. **Inflorescences** racemose, terminal or intercalary. **Sepals** oblong, membranous, outer 2 cucullate, inner two ± saccate. **Petals** oblanceolate to obovate, rounded, clawed. **Stamens** 6; filaments without appendages. **Nectaries** 2, large, ± horseshoe-shaped, 1 around outside of each short filament. **Ovary** elliptical, margined, compressed; 2-locular with 1 or 2 pendulous ovules per locule; stigma very shallowly 2-lobed, subsessile. **Fruit** an oval, elliptical or ± obovate silicula, often oblique, compressed, discoid, margined or narrowly winged, pendulous, indehiscent, generally 1(2 or 3)-seeded; valves membranous, 1-nerved, reticulately veined. **Seeds** oval or broadly oblong, compressed; cotyledons twice transversely folded.

Species 1: *Schlechteria capensis* Bolus, endemic to mountains of Western Cape near Clanwilliam.

Silicularia Compton 2878010

Compton: 147 (1953); Marais: 81 (1970).

Glabrous, slender, many-stemmed, virgate shrublets. **Leaves** linear or linear-oblanceolate, acute. **Inflorescences** terminal, many-flowered racemes. **Sepals** erect, weakly 3-nerved, inner 2 saccate. **Petals** obovate, rounded, cuneate. **Stamens** 6; filaments subulate, without appendages. **Nectaries** 2, horseshoe-shaped, 1 at base of each short filament. **Ovary** ± elliptic, sessile, compressed, imperfectly 2-locular; septum incomplete, 2-ovulate; style short or long. **Fruit** a subcircular to circular-elliptic or ovate-elliptic silicula, compressed, indehiscent, 1-seeded, 1-locular, but with marginal remains of septum, margin thickened; valves with indistinct midrib and radiating ridges; style persistent, short, stout. **Seeds** subcircular, compressed; cotyledons twice transversely folded.

Species 1: *Silicularia polygaloides* (Schltr.) Marais, endemic to Western Cape, known from mountains near Ceres.

***Sinapis** L. 2945000

Linnaeus: 668 (1753); Linnaeus: 299 (1754); Sonder: 32 (1860); Schulz: 335 (1936); Exell: 188 (1960); Chater: 339 (1964); Marais: 10 (1970).

Annual, rarely perennial, branched herbs, with simple hairs. **Leaves** simple, pinnatifid or pinnatisect. **Inflorescences** ebracteate racemes. **Sepals** spreading, not saccate. **Petals** shortly clawed, yellow. **Stamens** 6; filaments without appendages. **Nectaries** at base of long filaments, tongue-shaped, lateral ones reniform. **Fruit** a linear siliqua, 3–5-nerved, 0–9-seeded, sometimes flattened; valves convex; beak long. **Seeds** globose, in 1 row; cotyledons folded longitudinally around incumbent radicle. x = 6, 7 (polyploidy).

Species ± 10, Mediterranean region but some now widespread in other parts of Europe; 2 in sthn Afr.: **Sinapis arvensis* L., recorded in Mpumalanga, Gauteng, Free State, KwaZulu-Natal, and **S. alba* L. in the Eastern Cape as weeds of cultivation.

Sisymbrium L. 2917000

Linnaeus: 657 (1753); Linnaeus: 296 (1754); Sonder: 24 (1860); Schulz: 46 (1924); Adamson: 423 (1950); Phillips: 349 (1951); Exell: 118 (1960); Ball: 264 (1964); Schreiber: 48 (1966); Marais: 110 (1970); Jonsell: 62 (1982); Jonsell: 73 (1993).

Annual or biennial herbs or perennial suffrutices, with simple or branched hairs. **Leaves** entire, lobed, pinnatifid or pinnatisect. **Inflorescences** terminal, ebracteate racemes. **Sepals** spreading, not or slightly saccate at base. **Petals** clawed, generally yellow. **Stamens** 6; filaments without appendages. **Nectaries**: lateral ones ring-shaped, joining median ribbon-like glands. **Fruit** a linear, subterete siliqua; valves convex, 1–3-nerved, glabrous or hairy. **Seeds** in 1 or 2 rows, ± oblong; cotyledons incumbent or cotyledons longitudinally folded around radicle. x = 7 (aneuploids, high polyploidy).

Species 80, Eurasia, Mediterranean, Africa, South America; 6 indigenous and 2 naturalised in sthn Afr., widespread.

Thlaspeocarpa C.A.Sm. 2879000

Smith: 155 (1931); Schulz: 401 (1936); Phillips: 348 (1951); Compton: 153 (1953); Marais: 77 (1970).

Palmstruckia Sond.: 35 (1860); Marloth: 242 (1913).

Annual herbs. **Leaves** pectinately 3–9-lobed, rarely entire. **Inflorescences** terminal, ebracteate racemes. **Sepals** spreading, inner 2 slightly saccate. **Petals** obovate-cuneate, hardly clawed. **Stamens** 6, each of 2 short filaments with small appendage. **Nectaries** 2, large, biprismatic, one outside each short filament. **Ovary** elliptical, compressed, 2-locular, 1 locule usually sterile, other with 1 pendulous ovule, rarely 1 ovule in each cell; stigma capitate, subsessile. **Fruit** a subcircular silicula, compressed, discoid, pendulous, 1-seeded, apparently indehiscent; septum disappearing, fruit apparently 1-celled; valves 1-nerved. **Seeds** circular, broadly winged; cotyledons twice transversely folded.

Species 2, Africa; 2 in sthn Afr.: *Thlaspeocarpa capensis* (Sond.) C.A.Sm., endemic to Western Cape (Calvinia, Sutherland and Worcester districts) and *T. namaquensis* Marais, endemic to Namaqualand.

***Thlaspi** L. 2903000

Linnaeus: 645 (1753); Linnaeus: 292 (1754); Schulz: 444 (1936); Clapham: 318 (1964); Marais: 97 (1970); Jonsell: 27 (1982).

Annual or perennial herbs, usually glabrous; stems leafy. **Leaves** simple, mostly amplexicaul. **Inflorescences**

simple, ebracteate racemes. **Sepals** spreading, not saccate. **Petals** clawed, white, pink or mauve. **Stamens** 6; filaments without appendages. **Nectaries** 4, semilunar, one on either side of each short filament. **Ovary** with 2–16 ovules. **Fruit** an angustiseptate, oblong to circular or obovate silicula, usually deeply emarginate; valves keeled, generally winged. **Seeds** ellipsoid; cotyledon accumbent. $x = 7$ (aneuploids, high polyploidy).

Species 60, widespread in temperate regions of the northern hemisphere; 1 in sthn Afr.: **Thlaspi arvense* L., introduced, recorded only in the Eastern Cape.

*Turritis L. 3000000

Linnaeus: 666 (1753); Linnaeus: 298 (1754); Sonder: 22 (1860); Schulz: 548 (1936); Phillips: 352 (1951); Marais: 104 (1970); Jonsell: 48 (1982).

Tall, erect, leafy, biennial herbs with a taproot and sparsely branched to unbranched stems, with simple and branched hairs in basal part. **Leaves** densely arranged on stems, amplexicaul, entire, glabrous. **Inflorescences** terminal, elongate racemes. **Sepals** spreading, not saccate at base. **Petals** white or yellowish. **Stamens** 6; filaments without appendages. **Nectaries**: lateral ones ring-shaped, joined with ribbon-like, median glands. **Fruit** a linear, subterete or ± 4-angled siliqua; valves convex, 1-nerved. **Seeds** many in 1 or 2 rows, ovoid to angular; cotyledons accumbent. $x = 6, 8$ (polyploidy).

Species 3, Europe, W Asia and Africa; 1 in sthn Afr.: **Turritis glabra* L., introduced, recorded in Northern Province, Mpumalanga, KwaZulu-Natal, Lesotho and Eastern Cape.

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Bruniaceae

(Rosidae—Bruniales)

Compiled by A.V. Hall

Shrubs, spreading to erect, rarely small trees; often with coppice shoots sprouting from underground lignotubers after fires. **Leaves** usually small, spirally imbricate, linear to very broadly ovate, often keeled, sometimes petiolate, usually minutely stipulate, leaves in bud always uniquely with a fleshy terminal colleter, later shrinking to a dark apiculus or lost. **Flowers** bisexual, usually regular, small, from occasionally solitary and sometimes in stipitate spikelets, to spikes, panicles or dense capitula with a ± clavate receptacle; bracts 1–several per flower, if 1, then usually 2 bracteoles; floral receptacle bearing flower parts often ribbed, sometimes warty or wrinkled. **Calyx**: sepals 5, free or connate at base or vestigial, segments imbricate to well separated. **Corolla**: petals 5, rarely lightly adnate to connate with filaments to form a weak tube from below to up to most of filament length; often crested next to ovary; white to cream, sometimes mauve, purple or scarlet. **Stamens** 5, free, or adnate to connate as noted above; filaments linear; anthers 2-thecous with thecae sometimes partly free and ± divergent, opening by longitudinal slits. **Nectary** uncommon, a fleshy ring on top of ovary. **Ovary** usually half to fully inferior, rarely superior, sometimes with floral receptacle extended above to form a cup-shaped hypanthium; with 1–3(4 or 5) locules usually lateral to the flower stem plane, rarely oblique to dorsiventral; septa (wall(s) between locules) often incomplete; ovules 1–16 per locule, pendulous, sometimes sterile as dark flakes in spongy tissue filling the locule; placentas distal to rarely parietal or free-central from below; styles free to adnate or connate and distally divergent; stigmas minute. **Fruit** indehiscent to dehiscent with 2–4 valves. **Seeds** fleshy, testa thin.

Genera 9, species 57, endemic, Western Cape to KwaZulu-Natal, concentrated in the SW Western Cape.

Sonder: 309 (1862); Marloth: 35 (1925); Niedenzu & Harms: 288 (1930); Pillans: 121 (1947); Dahlgren: 21 (1988); Goldblatt & Manning (in prep.).

Classification of Bruniaceae

The subdivision into tribes proposed by Marloth (1925) and Niedenzu & Harms (1930) is not meaningful. Based on morphology, anatomy and chemotaxonomic data (G. Scott, pers. comm.) the genera are sequenced below by decreasing average apomorphy, constrained by the clustering:

Thamnea (3284000), *Audouinia* (3283000), *Berzelia* (3294000), *Brunia* (3292000), *Linconia* (3287000), *Pseudobaeckea* (3291000), *Staavia* (3290000), *Lonchostoma* (3286000), *Raspalia* (3288000).

Key to genera

1a Flowers ± 30–400 in each dense, generally spherical capitulum; stamens much exserted and very prominent at anthesis:
- 2a Leaves petiolate, soft-textured and easily bent at base; flowers with 1 or 2 styles ..... **Berzelia**
- 2b Leaves sessile, hard-textured and inflexible at base; flowers with 2 styles (includes *Nebelia*) ..... **Brunia**

1b Flowers usually not in dense, generally spherical capitula, or if rather dense then some 20 or less per capitulum; stamens mostly included, not prominent at anthesis:
- 3a Anther with a pale, apical, sterile lobe, thecae divergent by ± 30–45°; petals stiffly erect ..... **Linconia**
- 3b Apical lobe absent; thecae scarcely divergent; petals pliant and often spreading:
  - 4a Each flower in a spikelet solitary and terminal in an involucre of bracts at the end of a short stipe; spikelets on a peduncle 4–150 mm long; old stipes persistent (includes *Tittmannia*) ..... **Audouinia**
  - 4b Flowers, if solitary, then lacking a persistent stipe on a peduncle:
    - 5a Flowers in a spike; petals and filaments connate into a tube at least a quarter of length of corolla; ovary locules dorsiventral to oblique to the bract stem plane ..... **Lonchostoma**
    - 5b Flowers solitary, or in capitula or panicles; tube sometimes formed by light adnation of corolla and filaments; ovary locules collateral:
      - 6a Each flower solitary and terminal on a branch with ± 6–30 bracts; bracteoles absent; petals clawed ..... **Thamnea**
      - 6b Flowers grouped in panicles or capitula; bracteoles present; petals not clawed:
        - 7a Flowers in racemose or cymose panicles; leaves of a plant often prominently varying in size; sepals without apiculi ..... **Pseudobaeckea**
        - 7b Flowers in dense capitula; leaves of a plant with limited variation in size; sepals usually with a dark apiculus:
          - 8a Petioles absent to vestigial; leaves abaxially generally smoothly rounded; capitula usually lacking cream-white radiating bracts (includes *Mniothamnea*) ..... **Raspalia**
          - 8b Petioles slender; leaves abaxially deeply keeled; capitula with cream-white radiating bracts ..... **Staavia**

Audouinia Brongn. 3283000

Brongniart: 384 (1826); Sonder: 323 (1862); Pillans: 127 (1947).

Tittmannia Brongn.: 385 (1826) name conserved, not of Rchb.: Sonder: 312 (1862); Niedenzu & Harms: 298 (1930).

Low shrubs, sprawling to erect, often with coppice shoots sprouting from lignotubers after fires. **Leaves** ovate to narrowly lanceolate, longer in coppice shoots, sessile; leaf margins ciliate to lanate; minute stipules seldom visible; bud leaf colleter soon shrivelling to a black cone or lost. **Flowers** each in a spikelet, solitary and terminal in an involucre of 5–12 bracts at end of a short stipe, spikelets on an elongate peduncle, old stipes persistent; ciliate bracts with a prominent midrib and often several parallel veins, bases of two lowest bracts forming an inverted shallow bowl around narrowed tip of stipe; floral receptacle often with fleshy warts or transverse wrinkles and a rib below each sepal. **Calyx**:

sepals free, narrowly ovate to triangular, whitish to bright red; sepal midrib prominent, often with parallel lateral veins. **Corolla** white to bright red; petals free, clawed, glabrous, often with small crests next to ovary. **Stamens** free; anther thecae either united or partly free; pollen grains tricolporate. **Nectary** and scent either 0 or not recorded. **Ovary** inferior to half-inferior; locules 2 (also 3 and very rarely 4 or 5), wall between locules sometimes incomplete; ovules 1 or 2 per locule, or 0, pendulous, or ovules sterile as dark flakes in spongy tissue filling locule; styles terete or distally furrowed, rarely partly to fully free, erect or apically diverging. **Fruit** little known, at least sometimes indehiscent. **Seed** apparently germinating through fruit wall. $x = 11$.

Species 5, Western Cape, concentrated in the southwest.

Berzelia Brongn. 3294000

Brongniart: 370, t. 35 fig. 1 (1826); Sonder: 310 (1862); Pillans: 186 (1947).

Erect shrubs to rarely small trees, some with coppice shoots sprouting from lignotubers. **Leaves** linear or seldom broadly ovate; petiolate, soft-textured and easily bent at base; dark stipules present; bud leaf colleter a papilla becoming an apiculus, then shrivelling to a black cone or lost. **Flowers** borne in dense, spherical to very rarely elongate capitula with a narrowly elliptic to broadly clavate receptacle; flowers in each capitulum 80–130; capitula usually in a corymbose panicle; involucral bracts usually ovate to elliptic, mostly with adnate stipules; floral bracts narrowly elliptic to spathulate, usually without stipules; bracteoles 2; floral receptacle with rounded to angular ribs passing down from the sepals. **Calyx**: sepals free, often linear, sometimes broadly oblong, with a dark apiculus. **Corolla** white to pale cream or bright red, regular or irregular in lower flowers; petals oblong to narrowly lanceolate or clawed, basally with an adaxial crest; petal margins often with flaps partly enclosing the filaments and lightly adnate to them, forming a tube. **Stamens**: immature filaments often arched; anther thecae united or partly free and slightly to strongly divergent; pollen grains tricolporate. **Nectary** apparently 0; nectar rarely present at base of flower; scent usually 0, rarely faint or coffee-like or fishy. **Ovary** half- to three-quarters-inferior, locules 1 or 2, locules 2 in some peloric flowers, wall between locules often incomplete; ovule 1, rarely 0 or 2 per locule, or ovules sterile as dark flakes in spongy tissue filling locule; styles terete, when 2 then often divergent, stigmas terminal. **Fruit** comprising expanded ovary wall and attached persistent flower parts, mostly indehiscent, where not so, valves 2–4 and spreading. **Seeds** usually ellipsoid. $x = 10$ (aneuploids, high polyploidy).

Species 8, Western to Eastern Cape, mainly in the southwestern mountains and flats.

Brunia Lam. 3292000

Lamarck: 474 (1785); Sonder: 313 (1862) in part; Pillans: 178 (1947).

Nebelia Neck. ex Sweet: 116 (1830).

Erect or spreading shrubs to small trees, some sprouting from an underground lignotuber. **Leaves** lanceolate to oblanceolate or ovate; sessile, hard-textured and inflexible at base; stipules mostly absent; bud leaf colleter a papilla, darkening and shrinking to a narrow deltoid lamina or minute cone, later persistent or lost. **Flowers** borne in very dense spherical capitula with a clavate to globose receptacle; flowers in each capitulum 30–400; bracts closely appressed, spathulate to narrowly lanceolate or deltoid; bracteoles two, connate with the very short pedicel; floral receptacle with or without ribs. **Calyx**: sepals free, regular to sometimes irregular, linear to oblanceolate, with a dark apiculus. **Corolla** white to cream, usually regular, occasionally irregular near base of capitulum; petals very narrowly obovate to oblanceolate, lightly adnate to filaments forming a weak tube; each petal with two adaxial crests in tube, or if one, then diverging into 2 lobes. **Stamens** erect or some recurved by ± 90° near apex; anther thecae united or partly free and slightly divergent; pollen grains with 4–8 colpi. **Nectary** 0; scent seldom recorded, where known sweetish or cabbage-like. **Ovary** half- to fully inferior; locules 2, 1–3 ovules in each, sometimes with one locule barren; ovules often sterile as dark flakes in spongy tissue filling locule; styles slightly to nearly fully adnate, sometimes divergent. **Fruit** with persistent flower parts, indehiscent or a 4-valved capsule. **Seeds** ellipsoid to oblong. $x = 10$.

Species 7, mountains, mainly in the SW Western Cape, extending to the Cockscomb (SW Eastern Cape).

Linconia L. 3287000

Linnaeus: 216 (1771); Sonder: 317 (1862); Pillans: 130 (1947).

Erect shrubs sprouting from an underground lignotuber, distal branching sparse and clustered at nodal zones on stem. **Leaves** linear to narrowly elliptic; petiole appressed to stem; dark stipules present, later lost; bud leaf colleter later a conical, acuminate apiculus shrivelling to a minute black spot. **Flowers** in spikelets, each flower terminal within an involucre of bracts on a vestigial to minute stipe subtended by a leaf-like bract, spikelets arranged along peduncles; stipes persisting up to most or all of a year; involucre of 4 bracts distal on stipe, opposite and decussate, closely appressed, broadly ovate; floral receptacle ribbed or wrinkled. **Calyx** forming a vestigial collar, slightly lobed. **Corolla** white; petals free, elliptic to narrowly ovate, stiffly erect with crests lying against ovary. **Stamens** free from corolla; filaments erect, with an adaxial basal ridge lying partly over top of ovary; anthers with a pale, apical, sterile lobe, thecae prominently divergent; pollen tricolporate. **Nectary** and flower scent either 0 or unknown. **Ovary** half- to nearly fully inferior; locules 2, lateral, each with a single ovule, wall between locules well developed; styles free, divergent, stigmas terminal. **Fruit** unknown.

Species 2, Western Cape, rare in mountains from Ceres to Kogelberg, to Swellendam, extending to Humansdorp (SW Eastern Cape).

Lonchostoma Wikstr. 3286000

Wikström: 350, t. 10 (1818); Sonder: 316 (1862); Pillans: 133 (1947).

Erect to slightly spreading shrubs, some with coppice shoots sprouting from lignotubers after fires; sparse branching mainly from nodal zones. **Leaves** narrowly elliptic to elliptic or obovate, sessile and generally glabrous, margins flat to strongly incurved; stipules 0; bud leaf colleter erect to distally curved, shrivelling to a minute black apiculus, or lost. **Flowers** in a racemose spike; bracts appressed, elliptic to obovate or clawed, channelled; bracteoles present; floral receptacle minute. **Calyx** tubular below; segments subulate to broadly ovate. **Corolla** white to pink or purple; petal bases connate with stamens to form a tube; free parts of petals obovate, or narrowly so, or elliptic, spreading, glabrous, lacking crests next to ovary. **Stamens** arising from top of corolla tube; anther thecae partly free; pollen grains with 5–10 colpi. **Nectary** 0; scent not recorded. **Ovary** fully superior to two-thirds inferior; locules 2, placed dorsiventrally to obliquely to bract stem plane, sometimes with an interlocular passage; placentas, when parietal, T-

shaped, when axile then with 1 or 2 placental ridges in each locule, bearing 2–16 ovules; style distally branched. **Fruit** not recorded. $x = 11$ (1 report, polyploidy).

Species 5, Western Cape, rare in mountains from Cederberg southwards.

Pseudobaeckea Nied. 3291000

Niedenzu: 136 (1891); Pillans: 169 (1947).

Spreading, medium to tall shrubs, some with coppice shoots sprouting from underground lignotubers after fires. **Leaves** ovate to linear, with a short petiole; often with prominent variation in length on a plant; stipules absent; bud leaf colleter brown, acute to acuminate, later shrinking to a minute black semicone or ridge. **Flowers** in racemose or cymose panicles; floral receptacle trigonous to obconic, slightly to densely warty. **Calyx**: tube minute; segments broadly ovate to oblong, papery, lacking a dark tip. **Corolla** pale cream; petals free to lightly adnate to filaments, obovate to elliptic, with fleshy crests on adaxial surfaces of petal bases. **Stamens** with a basal fleshy crest; anther thecae partly free; pollen with 4 or 5 colpi. **Nectary** 0 to present as a pale ring around top of ovary, either low and fleshy or erect and laminate; scent not recorded. **Ovary** almost to fully inferior; locules 1 or 2, if 2 then wall between locules complete to partly so; ovules 1 or 2 per locule; styles 1 or 2, if 2, then lightly connate, then branching, with branches divergent; if style single then erect to curved. **Fruit** mostly unknown, globose, with or without warts. **Seeds** unknown. $x = 11$ (1 report).

Species 3, Western Cape, mainly in southwest, extending to Uitenhage (S Eastern Cape).

Raspalia Brongn. 3288000

Brongniart: 377, t. 37 fig. 1 (1826) under *Berardia* Brongn.; Sonder: 318 (1862) in part; Pillans: 147 (1947).

Mniothamnea (Oliv.) Nied.: 136 (1891); Niedenzu & Harms: 302 (1930).

Shrubs erect to sprawling, seldom with coppice shoots sprouting from lignotubers. **Leaves** linear to broadly ovate, abaxially smoothly rounded, petiole 0 to vestigial; stipules 0; bud leaf colleter papilloid to deltoid, eroding to a minute black patch, rarely retained intact. **Flowers** solitary or in terminal, usually semiglobose capitula; bracts closely appressed to rarely spreading, ovate to elliptic, with a black apiculus, midrib not visible; bracteoles 2, rarely 1 or absent, lanceolate to spathulate or obovate; floral receptacle obconic to rarely oblong, sometimes with slight ribs passing up to sepals. **Calyx**: tube minute; segments deltoid to ovate, midrib scarcely visible, usually with a dark apiculus. **Corolla** white to magenta, free from filaments, obovate to oblong or elliptic; a crest partly covering edge of ovary. **Stamens** free from petals; filaments often incurved; anther thecae usually partly free, rarely fused or divergent; pollen with 3–6 colpi. **Nectary** a pale fleshy ring around top edge of ovary; scent known in one of the species: sweet and musky. **Ovary** fully to half-inferior; locules usually 2, seldom 1, very rarely 3, wall between locules often incomplete at anthesis; ovules either 1 or 2 or 0 in one locule; styles adnate to connate below the erect or distally divergent branches. **Fruit**, where known, either indehiscent, with receptacle enlarged and persistent flower parts attached, or rarely dehiscing with capsule valves. **Seeds** ovoid, lacking an elaiosome. $x = 11$ (1 report).

Species 11, mainly SW Western Cape, to extremely rare in KwaZulu-Natal.

Staavia Dahl 3290000

Dahl: 15 (1787); Sonder: 321 (1862) in part; Pillans: 169 (1947).

Shrubs erect to sprawling or dwarf, rarely with coppice shoots sprouting from a lignotuber. **Leaves** narrowly ovate to linear, abaxially deeply and prominently keeled; with a slender petiole; dark stipules present, later lost; bud leaf colleter slender to conical, later shrinking or lost. **Flowers** in dense capitula; bracts forming a radiating involucre, linear to ovate, the outer leaf-like, green, the inner often cream-white; bracteoles filiform; floral receptacle slightly to closely ribbed. **Calyx** with a tube; segments narrowly deltoid, up to half darkened from apex. **Corolla** white to deep mauve-pink; petals free, elliptic to sometimes oblong, entire to undulate or toothed, fitting tightly together and crested to form a cup covering edge of ovary. **Stamens** free from corolla, usually with a swelling near base matching petal crests, erect to incurving; anther thecae adnate; pollen grains with 4 or 5 colpi. **Nectary** 0; scent mostly not recorded, in one species faintly sweet. **Ovary** inferior to almost so; locules 1 or 2, if 2 then wall between locules sometimes incomplete; ovules 1 or 2 per locule or rarely an ovule lacking in one locule; ovules pendulous, often with a prominent caruncular cap; styles often swollen below, two branches connate, or connate nearly to apex with branches divergent, stigmas terminal. **Fruit** a 2–4-valved capsule with remains of flower parts. **Seeds** dark, usually with a basal elaiosome. $x = 8, 11$ (1 report, aneuploids).

Species 9, Western Cape, mainly in the southwest.

Thamnea Sol. ex Brongn. 3284000

Brongniart: 386 (1826); Sonder: 324 (1862); Pillans: 143 (1947).

Shrubs, erect to sprawling, some with coppice shoots sprouting from lignotubers after fires. **Leaves** spiral to rarely opposite and decussate, generally minute, hard-textured and sessile, narrow, elliptic to ovate, glabrous to verruculose, margins and keel mostly narrowly hyaline or warty; stipules often present as minute dark papillae, later lost; bud leaf colleter a narrow papilla becoming a broadly triangular or semiconical apiculus, later shrinking to lost. **Flowers** solitary and terminal on a branch with an involucre of ± 6–30 bracts; bracteoles 0; floral receptacle finely ribbed, sometimes extended above to form a hypanthium. **Calyx**: sepals free, lanceolate to narrowly ovate. **Corolla** white to pink or basally purple; petals free, spreading, clawed, sometimes with crests next to ovary. **Stamens** free from corolla; anthers slender; pollen grains with 3–5 colpi. **Nectary** 0 to a thin to fleshy green collar; nectar and scent not recorded. **Ovary** superior to half-inferior, with 1 or 2 locules; ovules 4–8, pendulous; wall between locules often incomplete at anthesis with placenta basal, free-central, axile, or a reduced placenta in summit of ovary; style erect, stigma solitary, obtuse to capitate or truncate. **Fruit** ellipsoid to spheroidal or oblong.

Species 7, Western Cape, mainly in the Ceres region.

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Buddlejaceae

(Asteridae—Gentianales)

Compiled by J.E. Victor

Shrubs, trees or suffrutices; pubescence often scaly or stellate. **Leaves** opposite or occasionally subopposite, alternate or ternate, simple, petiolate or sometimes connate at base; stipules present or represented by an interpetiolar ridge, sometimes obscure. **Inflorescence** of many-flowered, terminal or axillary, paniculate cymes, or corymbosely congested, sometimes contracted into pseudoheads or umbels, or in terminal racemes with 2-bracteate pedicels. **Flowers** regular, bisexual. **Calyx** 4-lobed. **Corolla** 4-lobed; tube short to long, campanulate to cylindric, sometimes bearded in the throat; lobes becoming recurved or reflexed in open flower. **Stamens** 4, arising on corolla tube at, in or near throat, included to long-exserted, free portion of filament short to long; anthers basifixed, with longitudinal slits. **Ovary** superior, 2-locular, pubescent; stigma terminal, sometimes decurrent; ovules several to many on thickened axile placentas, hemitropous. **Capsules** small, subcylindric, ovoid, obovoid or oblong, sometimes 2-lobed, septicidally dehiscent, the valves usually splitting at apex. **Seeds** with endosperm; embryo straight.

Genera 8, species 120, Africa, Mascarenes, Asia and America; sthn Afr.: genera 3, species ± 14.

Wilhelm: 90 (1910); Verdoorn: 150 (1963) under Loganiaceae; Roessler: 1 (1967); Leeuwenberg: 327 (1983) under Loganiaceae; Takhtajan: 452, 457 (1997).

The family was formerly included in the Loganiaceae.

Key to genera

1a Inflorescence cymose, paniculate; trees, shrubs, or stragglers:
  2a Leaves usually 3-nate, if opposite, then not densely scaly or tomentose beneath; calyx coriaceous, usually lined with appressed hairs; corolla circumscissile near base; anther thecae confluent ..... **Nuxia**
  2b Leaves opposite or subopposite, usually discolorous, with lower surface densely scaly or tomentose; calyx herbaceous, glabrous within; corolla not circumscissile; anther thecae distinct ..... **Buddleja**
1b Inflorescence racemose; suffrutices ..... **Gomphostigma**

Buddleja L. 6473000

Linnaeus: 112 (1753); Verdoorn: 159 (1963) as *Buddleia*; Leeuwenberg: 333 (1983).

Chilianthus Burch.: 94 (1822).

Shrubs, erect, bushy, scrambling or climbing, sometimes trees; pubescence often scaly or stellate. **Leaves** opposite or occasionally subopposite. **Inflorescence** of many-flowered, terminal and axillary, paniculate cymes, occasionally cymes congested into subglobose heads. **Calyx** pubescent without, glabrous within, persistent. **Corolla**: tube short to long, campanulate to cylindric, sometimes bearded in throat; lobes imbricate, becoming strongly recurved from above base. **Stamens** arising on corolla tube at or near throat, included to long-exserted; anther thecae distinct, ± parallel. **Ovary** pubescent. **Capsules** small, ovoid, obovoid or oblong, sometimes 2-lobed, shortly or long-exserted from persistent calyx. **Seeds** oblong, compressed. $x = 19$ (high polyploidy).

Species ± 100, Africa, Asia and America; 7 in sthn Afr., widespread.

Gomphostigma Turcz. 6470000

Turczaninow: 53 (1843); Verdoorn: 168 (1963); Leeuwenberg: 343 (1983).

Suffrutices, canescent, with mostly stellate scales. **Leaves** opposite, rarely ternate, sometimes appearing fascicled, connate at base or with a ridge between them. **Flowers** in terminal racemes; pedicels bibracteate. **Calyx** cuneate at base. **Corolla** tube not longer than calyx; lobes broad, recurved in open flower. **Stamens** arising in throat of corolla; free portion of filament shorter than anthers; anthers exserted or subexserted. **Capsule** subcylindric, 2-lobed, 2-valved, with valves splitting. **Seeds** many.

Species 2, Africa, both extending into sthn Afr.; *Gomphostigma virgatum* (L.f.) Baill. is a widespread rheophyte, *G. incomptum* (L.f.) N.E.Br. occurs in karroid areas of the Northern andWestern Cape.

Nuxia Comm. ex Lam. 6469000

Lamarck: 295 t. 71 (1791); Verdoorn: 150 (1963); Leeuwenberg: 349 (1983).

Lachnopylis Hochst.: 77 (1843); Phillips: 575 (1951).

Shrubs or trees with fibrous, stringy bark. **Leaves** ternate, sometimes opposite, rarely some leaves alternate, petiolate, glabrous, scaly or variously pubescent, sometimes glutinous; hairs simple, branched or gland-tipped, short or long, dense or sparse; margin entire or variously toothed or lobed, sometimes somewhat undulate. **Cymes** in terminal panicles or corymbosely congested, sometimes contracted into pseudoheads or umbels. **Calyx** tubular-campanulate; lobes erect; tube usually appressed-hairy within. **Corolla** with tube usually included in calyx, circumscissile near base and often bearded in throat; lobes usually reflexed over the erect calyx lobes. **Stamens** arising in or just below throat of corolla tube; anthers exserted, thecae confluent. **Ovary** 2-locular, narrowed into style; stigma terminal, usually exserted;

ovules many in each locule. **Capsule** small, slightly longer than to twice as long as persistent calyx, septicidally 2-valved, valves splitting at apex; placenta free. **Seeds** many.

Species ± 40, Africa, Madagascar and Mascarene Islands; 5 in sthn Afr., widespread.

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Burseraceae

(Rosidae—Sapindales)

Compiled by R.H. Archer

Trees or many-stemmed shrubs, dioecious or polygamous, rarely monoecious; bark often peeling or flaking, with resin ducts, secreting an odoriferous resin. **Branchlets** often spine-tipped. **Leaves** alternate, simple, trifoliolate or imparipinnate; stipules 0. **Flowers** unisexual, rarely bisexual, regular, usually small, perigynous to hypogynous; in axillary simple or compound dichasial or paniculate cymes, or singly in clusters; male flowers usually larger than female flowers. **Calyx** infundibuliform, campanulate with 4 valvate, persistent lobes. **Petals** 4, free or united near base, usually yellow to green. **Disc** in perigynous flowers adnate to hypanthium, cylindrical; in hypogynous flowers not adnate to calyx or corolla, intrastaminal, cylindrical, usually with 4 large or with 4 large and 4 small lobes. **Stamens** 8(4), obdiplostemonous, 4 antesepalous stamens longer than other 4, arising on outside or on top of disc; anthers introrse, with longitudinal slits; staminodes present in female flowers. **Ovary** half-inferior or superior; rudimentary in male flowers; 2-locular; with 2 epitropous ovules per locule, pendulous on axile placenta; style short; stigma capitate, obscurely 2–4-lobed. **Fruit** an ovoid to subglobose drupe; in ripe fruit the thin exocarp and fleshy mesocarp splitting into 2 longitudinal valves to expose a crustaceous or bony endocarp (putamen), usually clasped by a red or yellowish pseudo-aril; pseudo-aril either cupular with short lobes or arms, or with 2–4 relatively long arms, or covering ± whole putamen without distinct arms; putamen usually enclosing 1 fertile locule and 1 much smaller abortive locule. **Seeds**: embryo straight, cotyledons much folded. $x = 13$ (polyploidy).

Genera 16, with ± 500 species distributed mainly in the tropics, but especially in Malaysia, Africa and South America; sthn Afr.: genus 1, species 31.

Wild: 263 (1963); Merxmüller: 1 (1968); Van der Walt: 53 (1973); Van der Walt: 195 (1975); Van der Walt: 5 (1986).

Commiphora Jacq. 4151000

Jacquin: 66 (1797) name conserved; Wild: 67 (1959); Wild: 263 (1963); Merxmüller: 1 (1968); Van der Walt: 53 (1973); Van der Walt: 5 (1986).

Balsamodendrum Kunth: 348 (1824); Sonder: 526 (1860).

Description as for family.

Species nearly 200, mostly in Africa, some in India and Arabian Peninsula; 31 in sthn Afr., widespread.

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Buxaceae

(Dilleniidae—Buxales)

Compiled by R.H. Archer

Trees or shrubs, evergreen, monoecious. **Leaves** opposite, shortly petiolate, simple, entire; stipules 0. **Flowers** regular, unisexual, small, sessile or shortly pedicelled in compact, axillary racemes or cymes, with terminal flowers usually female and remainder male, rarely a few bisexual. **Perianth** (calyx) usually of 2 sepaloid whorls. **Male flowers**: perianth segments 4, sometimes 6, usually in 2 series, imbricate; stamens 4–6, rarely more, when 4 then opposite perianth segments, when 6 then 2 pairs opposite inner segments; filaments free, exserted; anthers 2-thecous, dorsifixed near base, opening lengthwise, often large; pistil absent or rudimentary. **Female flowers**: perianth segments 4–6; lobes imbricate, outer smaller; ovary superior, 3-locular, with 2 pendulous, anatropous ovules from outer angles in

each locule; styles 3, free, often diverging, thick, undivided. **Fruit** a somewhat woody loculicidal capsule with 3 horns (persistent styles). **Seeds** somewhat 3-angled, black, shiny; testa crustaceous; embryo straight; endosperm firm. $x = 14$ (polyploidy).

Genera 4, species 100, nearly cosmopolitan, but mainly northern hemisphere; sthn Afr.: genus 1, species 2.

Hutchinson: 105 (1967); Glen: 37 (1996).

Buxus L. 4533000

Linnaeus: 983 (1753); Hutchinson: 108 (1967); Friis: 293 (1989); Glen: 37 (1996).

Notobuxus Oliv.: t. 1400 (1882); Hutchinson: 375 (1915) as Euphorbiaceae; Phillips: 138 (1943).

Description as for family.

Species 80, mainly north temperate, 9 in Africa; 2 in sthn Afr., Northern Province, Gauteng, Mpumalanga, KwaZulu-Natal to Eastern Cape.

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Cabombaceae

(Magnoliidae—Nymphaeales)

Compiled by R.P. Glen

Stoloniferous, perennial, aquatic herbs rooted in mud, submerged parts heavily covered with mucilaginous jelly, particularly younger parts. **Stem** rhizomatous with floating or creeping runners bearing leaves. **Leaves** alternate, long-petiolate, blades peltate, oval, floating, young leaves inrolled longitudinally, submerged; stipules 0. **Flowers** bisexual, regular, solitary in leaf axils, long-pedicellate. **Sepals** 3, free. **Petals** 3, free, linear, hypogynous, purple, reflexed at anthesis, becoming erect in fruit. **Stamens** 18–36; anthers extrorse, opening lengthwise. **Carpels** 4–18, free, oblong-ovate; style very short or absent; stigma attenuated, entire; ovules 2 per carpel, parietal, pendulous. **Fruiting carpels** indehiscent, beaked, 1 or 2 seeds. **Seeds** globular, smooth or partly and minutely papillate, operculate, without aril; endosperm scanty, perisperm copious. $x = 10$ (polyploidy).

Genera 2, species 8, tropical to warm-temperate areas of Old and New World; sthn Afr.: genus 1, species 1.

Cook: 60 (1990); Wild: 173 (1960); Zomlefer: 51 (1994).

Brasenia Schreb. 2510000

Schreber: 372 (1789); Wild: 173 (1960); Aston: 46 (1973); Cook: 60 (1990).

Description as for family.

Species 1: *Brasenia schreberi* J.F.Gmel., America, Australia and Africa; very common in the Okavango Swamps (Botswana), one record from Loskop Dam (Mpumalanga).

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Cactaceae

(Caryophyllidae—Caryophyllales)

Compiled by H.F. Glen

Perennial plants with variously modified succulent stems, epiphytes, shrubs or trees, often spiny; spines, branches, flowers and often irritant hairs (glochids) arise from usually raised cushions or areoles which may represent axillary buds or condensed side branches. **Leaves** usually rudimentary. **Flowers** bisexual, regular, rarely irregular, usually showy, solitary or clustered, axillary. **Calyx** adnate to ovary and shortly tubular above; lobes often numerous, in several rows, scale-like, foliaceous, or petaloid. **Corolla** usually of many petals in several rows, free or connate into a short tube, the outer merging into sepals. **Stamens** usually numerous, in several rows, arising in calyx throat, sometimes adnate to base of petals; anthers 2-thecous. **Ovary** inferior, 1-locular, with many ovules on 3 or more parietal placentas; style terminal, simple, with as many stigmas as placentas. **Fruit** a berry, rarely dry, smooth or ± spiny. **Seeds** many, with smooth and shiny or tuberculate, often black testa.

Genera 100–150, species ± 2 000, mostly arid, tropical America; sthn Afr.: genera 7 (6 naturalised), species 19 (18 naturalised). Many species cultivated, often naturalised in hot dry regions worldwide; often troublesome invaders. Only *Rhipsalis* is considered an Old World genus and appears to be indigenous.

Harvey: 479 (1862); Britton & Rose (1919–23); Berger (1929); Backeberg (1958–62); Obermeyer: 144 (1976); IOS Working Party: 65 (1986); IOS Working Party: 85 (1990); Barthlott & Hunt: 161 (1993); Glen *et al.* (in prep.).

Key to genera

1a Stems divided into flattened joints (pads) ..... ***Opuntia**
1b Stems terete or winged, not flattened:
2a Stems 3-angled ..... ***Hylocereus**
2b Stems cylindrical:
3a Branches ± terete, without longitudinal ribs:
4a Branches tuberculate ..... ***Opuntia**
4b Branches smooth:
5a Pendulous herbs; paired hooked thorns absent; leaves absent; flowers solitary; fruit up to 10 mm in diameter ..... **Rhipsalis**
5b Erect shrubs; paired hooked thorns present on older parts of extension growths; leaves present; flowers in panicles; fruit ± 20 mm in diameter..... ***Pereskia**
3b Branches winged or with conspicuous longitudinal ribs:
6a Erect trees or shrubs:
7a Shrubs up to 1–2 m tall; mature spines brown; flowers white and pink ..... ***Echinopsis**
7b Trees up to 5 m tall; mature spines grey; flowers greenish and white ..... ***Cereus**
6b Climbing plants ..... ***Harrisia**

*Cereus Mill. 5401000

Miller: [308] (1754); Haworth: 178 (1812); Britton & Rose: 3 (1920); Berger: 107 (1929); Buxbaum: 410 (1968); IOS Working Party: 70 (1986); IOS Working Party: 90 (1990); Barthlott & Hunt: 180 (1993).

Piptanthocereus (A.Berger) Riccob.: 225 (1909).

Erect stem-succulent trees 2–7 m tall. **Trunk** branched at base. **Stems** cylindrical. **Branches** 6–8-winged, wings compressed when young, broader later, margins relatively straight or evenly spiral. **Areoles** with 3 central spines 10–20 mm long, yellow or brown when young, ageing grey, and 4–8 peripheral spines 4–6 mm long, yellow or brown when young, ageing grey. **Flowers** solitary. **Sepals** greenish, lorate, apices obtuse. **Petals** white, lorate, apices obtuse. **Stamens** many, oblique in mature flower. **Ovary** dark green; stigma lobes 16–20. **Fruit** (ripe) red, ellipsoid, skin smooth, pulp white. **Seeds** black. $x = 11$ (aneuploids, polyploidy).

Species ± 40, Caribbean and South America; **Cereus jamacaru* DC. (locally often referred to as **C. peruvianus*) is naturalised in the bushveld areas of the Northern Province, Mpumalanga, Gauteng and North-West.

*Echinopsis Zucc. 5406010

Zuccarini: 675 (1837); IOS working party: 91 (1990); Barthlott & Hunt: 184 (1993).

Trichocereus (A.Berger) Riccob.: 236 (1909); Backeberg: 1095 (1959); Kiesling: 279 (1978).

Erect stem-succulent shrubs 1–2 m tall. **Stems** cylindrical. **Branches** 10–15-winged, glaucous, margins relatively straight or evenly spiral. **Areoles** ± 10 mm apart, with 1 central spine, yellow when young, ageing brown, and 8–10 peripheral spines 6–10 mm long, yellow when young, ageing brown. **Flowers** solitary, ± 20 mm long overall, mouth ± 15 mm in diameter. **Sepals** white. **Petals** pink or red. **Fruit** spherical to narrowly ovoid or oblong, fleshy to dry. **Seeds** dull black, more or less warty. $x = 11$.

Species ± 60, South America; **Echinopsis spachianus* (Lem.) Friedrich & Rowley, is invasive in Eastern Cape.

*Harrisia Britton 5401010

Britton 35: 561 (1908); Britton & Rose 2: 147 (1920); Obermeyer: 145 (1976); IOS Working Party: 69 (1986); IOS Working Party: 89 (1990); Barthlott & Hunt: 178 (1993).

Eriocereus Riccob.: 238 (1909).

Climbing stem-succulent shrubs over 2 m tall. **Stems** cylindrical. **Branches** 4- or 5-winged, ribs broad, margin relatively straight or evenly spiral; young joints glaucous, becoming green. **Areoles** 30–35 mm apart, with 1 brown central spine 20–30 mm long, and 5–7 peripheral spines; glochidia absent. **Flowers** solitary. **Sepals**: segments greenish, lorate, with margins and apices red. **Petals** white, pink or red, lorate. **Fruit** (ripe) red, round, skin scaly, pulp white. **Seeds** black. $x = 11$ (1 report).

Species ± 20, Caribbean and South America; **Harrisia martinii* (Labour.) Britton is naturalised in KwaZulu-Natal.

*Hylocereus (A.Berger) Britton & Rose 5401060

Britton & Rose: 428 (1909); Backeberg 2: 803 (1959); IOS Working Party: 69 (1986); IOS Working Party: 89 (1990); Barthlott & Hunt: 179 (1993).

Climbing stem-succulent shrubs. **Branches** 3-winged, ribs compressed, margin strongly undulate, becoming horny with age. **Areoles** up to 40 mm apart, with 1 central spine 2–4 mm long and up to 2 peripheral spines 2–4 mm long. **Flowers** solitary. **Sepals** lorate, greenish or yellowish, apices acuminate. **Petals** spathulate, green, apices acute. **Stamens** of mature flower roughly parallel to perianth. **Style** cream; stigma lobes ± 24. **Fruit** (ripe) red, oblong, scaly. **Seeds** black. $x = 11$.

Species ± 18, tropical America; **Hylocereus undatus* (Haw.) Britton & Rose, is recorded as invasive in KwaZulu-Natal and Eastern Cape.

*Opuntia Mill. 5417000

Miller: [974] (1754); Britton & Rose 1: 42 (1919); Berger: 48 (1929); Obermeyer: 149 (1976); IOS Working Party: 75 (1986); IOS Working Party: 88 (1990); Barthlott & Hunt: 172 (1993).

Cylindropuntia (Engelm.) F.Knuth: 117, 410 (1935). *Austrocylindropuntia* Backeb.: [21] (1938).

Erect or prostrate stem-succulent shrubs or trees. **Stems** divided into flattened, usually elliptic joints (pads), or stems terete, branches tuberculate. **Areoles** with up to 30 spines each; glochidia present. **Leaves** usually absent or inconspicuous and soon deciduous. **Flowers** solitary. **Petals** various. **Fruit** (ripe) purple, red or yellow, round, ellipsoid or ovoid, skin usually with glochidia, pulp greenish or red. **Seeds** whitish to mid-brown; hilum white. $x = 11$ (high polyploidy).

Species ± 240, North and South America; at least 14 species are naturalised in sthn Afr.; several are widespread throughout the region.

N.P. Taylor (personal communication) states 'On the basis of seed anatomical features (W. Stuppy, unpublished) and pollen morphology (Leuenberger 1976) I would recognise the following segregate genera from amongst those taxa introduced in South Africa: **Austrocylindropuntia* Backeb. (**O. cylindrica* and *subulata*); **Cylindropuntia* (En-

gelm.) F. Knuth (**O. rosea* and *imbricata*) and **Opuntia* in strict sense (all others). All the names are available either way.' It seems from Taylor's letter and the references he cites that all species of **Opuntia* with flat pads belong to the narrow interpretation of the genus, but species with cylindrical joints may belong to any of the three segregate genera. With the evidence available at the time of writing, there is no obvious way of distinguishing between these genera without seeds or pollen. Therefore, they are treated as one here, and a more definitive decision is deferred until the publication of the paper by Glen *et al.* (in prep.).

*Pereskia Mill. 5421000

Miller: [1026] (1754); Britton & Rose 1: 8 (1920); Berger: 41 (1929); Obermeyer: 156 (1976); IOS working party: 69 (1986); Leuenberger: 53 (1986); IOS Working Party: 88 (1990); Barthlott & Hunt: 171 (1993).

Climbing stem-succulent shrubs 2–10 m tall. **Branches** terete, green. **Areoles** with 1–3 charcoal-grey spines; paired hooked thorns present. **Leaves** oblong to ovate, up to 70 mm long. **Flowers** in panicles; bracts few, elongated, leaf-like. **Sepals** 4–7, greenish. **Petals** 7–12, white, apices obtuse. **Stamens** of mature flower oblique. **Ovary** dark green, surface with spines. **Fruit** (ripe) yellow, ± 20 mm in diameter, skin smooth. **Seeds** black. $x = 11$.

Species 20, Central and South America; **Pereskia aculeata* Mill., is a serious pest in coastal forest in KwaZulu-Natal.

Rhipsalis Gaertn. 5416000

Gaertner: 137, t. 28 (1788) name conserved; Harvey: 479 (1862); Britton & Rose 4: 219 (1923); Berger: 89 (1929); Obermeyer: 147 (1976); IOS Working Party: 70 (1986); IOS Working Party: 92 (1990); Barthlott & Hunt: 188 (1993); Barthlott & Taylor: 48 (1995); Smith & Steyn: 135 (1997).

Succulent, leafless shrublets or shrubs. **Branches** terete or leaf-like, often jointed, sometimes epiphytic. **Leaves** scale-like or 0. **Areoles** with 1 or 2 spines. **Flowers** solitary, usually lateral. **Calyx** not united above ovary; lobes 3–many, scale-like, greenish. **Petals** 6–10, oblong, spreading, green or white. **Stamens** many; filaments subequal, perpendicular to perianth; anthers short. **Ovary** smooth, usually glabrous; style divided into 2–many stigmas. **Fruit** a subglobose berry, crowned with persistent perianth, sometimes with a few spines, cream-coloured; flesh white. **Seeds** somewhat pear-shaped, dark brown to black. $x = 11$ (polyploidy).

Species ± 50, Africa, Asia, America; 1 in South Africa: *Rhipsalis baccifera* (J.S.Mill.) Stearn subsp. *mauritiana* (DC.) Barthlott; KwaZulu-Natal coast into Eastern Cape near Komga.

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Callitrichaceae

(Asteridae—Lamiales)

Compiled by R.H. Archer

Small, delicate, often submerged aquatic or terrestrial herbs with limited vascular system; monoecious. **Leaves** opposite, small, entire; stipules 0. **Flowers** unisexual, small, axillary, solitary, rarely a male and female flower from the same leaf axil forming an apparently bisexual flower; bracts caducous; perianth absent. **Male flowers**: stamen 1: filament filiform, elongated or shorter than ovary; anther 2-thecous, opening by longitudinal slits joining at the top. **Female flowers**: ovary superior, 2(–4)-locular, (2–)4-furrowed and -lobed, sessile or shortly stalked, with a single, pendulous, axile, anatropous, unitegmic ovule in each locule; styles 2, longer or shorter than ovary, papillose on either side. **Fruit** leathery, compressed, indehiscent, with lobes dorsally margined or winged, 2(–4)-seeded. **Seeds** with oily endosperm. $x = 5$ (3, 4, 14, 19) (polyploidy).

Genus 1, species ± 25, cosmopolitan; 2 in sthn Afr.

Callitriche L. 4530000

Linnaeus: 969 (1753); Marloth: 141 (1925).

Description as for family.

Species ± 25, cosmopolitan; 2 in sthn Afr., Namibia, KwaZulu-Natal and Western Cape.

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Campanulaceae

(Asteridae—Asterales)

Compiled by W.G. Welman

Herbs, undershrubs, or small shrubs, often with milky juice. **Leaves** alternate, rarely opposite or whorled, simple, entire, toothed, lobed or cut, rarely rudimentary; stipules 0. **Flowers** bisexual, regular, in cymes, racemes or panicles or axillary and solitary; bracts present or absent. **Calyx** (3 or 4)5(6–10)-lobed or -partite (calyx tube refers to portion above ovary); lobes equal or unequal, valvate. **Corolla** gamopetalous, 4- or 5-lobed; tube campanulate, cylindric, rarely funnel-shaped, arising at line where calyx becomes free from ovary. **Stamens** as many as corolla lobes and alternating with them, free from or arising in corolla tube; filaments free or connate into a tube, often dilated at base; anthers free but often connivent, 2-thecous, opening lengthwise. **Ovary** inferior, half-superior or rarely superior, (1)2–5(6–10)-locular, with axile placentas, rarely basal or apical, 2–few to many ovules in each locule; style simple, often hidden by connate to connivent stamens; stigmas as many as locules. **Fruit** a capsule or berry, often crowned with persistent calyx, variously dehiscent, rarely indehiscent. **Seeds** often small, smooth or reticulate-rugose.

Genera ± 35, species ± 700, cosmopolitan, especially in Mediterranean region and sthn Afr., relatively few in the African tropics; sthn Afr.: genera 12, species ± 260. Lobeliaceae (incl. Cyphiaceae) is sometimes classified under Campanulaceae in broad sense, which would then consist of three subfamilies, namely **Campanuloideae** (Flowers ± regular; anthers usually eventually free: all genera of Campanulaceae in strict sense, treated below); **Cyphioideae** (Flowers irregular; stamens sometimes united, anthers free: *Cyphia*); **Lobelioideae** (Flowers usually irregular; anthers connate: *Grammatotheca*, *Lobelia*, *Monopsis*, *Wimmerella* (=*Laurentia*)).

Sonder: 530 (1865) in broad sense, excluding Lobeliaceae and Goodeniaceae; Thulin: 87 (1983).

Key to genera

1a Leaves small, broadly ovate, hard, glabrous, densely imbricate, in 4 rows ..... **Rhigiophyllum**
1b Leaves not as above:
2a Stamens arising high in corolla tube; ovules rarely more than 6 ..... **Siphocodon**
2b Stamens free from corolla or arising on lower portion of tube:
3a Ovary 1-locular or incompletely 2-locular, with 4 basal ovules; stamens free; corolla with long slender tube ..... **Merciera**
3b Ovary 2–5(6–10)-locular; ovules many:
4a Capsule indehiscent, tardily opening by the irregular decomposition of the pericarp between the persistent lateral nerves; annuals ..... **Gunillaea**
4b Capsule dehiscent; annuals or perennials:
5a Capsule dehiscing septicidally by 3 longitudinal splits ..... **Namacodon**
5b Capsule dehiscing not as above:
6a Capsule bursting at apex or opening by a terminal pore or lid:
7a Ovary 2-locular; capsule cylindric or barrel-shaped, opening by a terminal pore or bursting irregularly; shrubs or shrublets:
8a Inflorescence 1–few-flowered, closely subtended by leaves ..... **Roella**
8b Inflorescence usually pedunculate; capsule elongate, at length splitting nearly to base into 5 segments.... ..... **Prismatocarpus**
7b Ovary 3(2)-locular; capsule campanulate, opening by terminal cap, walls breaking down in fruit; small prostrate perennial herbs, often mat-forming ..... **Craterocapsa**
6b Capsule opening regularly by terminal valves:
9a Corolla campanulate or funnel-shaped ..... **Wahlenbergia**
9b Corolla cylindric:
10a Ovary 2-locular, subglobose, hairy; stamens 5, free from corolla tube, included; stigma 2-lobed ... **Treichelia**
10b Ovary 3–5-locular:
11a Ovary 5-locular; stigma 5-lobed ..... **Microcodon**
11b Ovary 3(4)-locular; stigma club-shaped, with 3 glandular lobes ..... **Theilera**

Craterocapsa Hilliard & B.L.Burtt 8668010

Hilliard & Burtt: 314 (1973).

Perennial herbs, prostrate, often mat-forming. **Leaves** alternate, occasionally opposite. **Flowers** sessile or shortly pedicellate, usually solitary, occasionally a few from the axis of a leaf, terminal or pseudolateral. **Calyx**: tube free, short; lobes narrowly triangular or foliaceous. **Corolla** funnel-shaped, shortly 5-lobed. **Stamens** free; filaments dilated below. **Style** swollen at base or surrounded by a disc, (2)3-branched. **Ovary** entirely inferior, campanulate, (2)3-locular, with many ovules produced above middle of placenta, walls very delicate. **Fruit** a capsule often becoming 1-locular on maturity, dehiscing through an apical lid. **Seeds** ellipsoid, slightly angled.

Species 4, sthn Afr., with 1 extending into Zimbabwe; mainly on eastern high mountains, Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Eastern Cape.

Gunillaea Thulin 8663020

Thulin: 166 (1974).

Annual herbs. **Leaves** alternate, sessile, flat. **Inflorescences** ± frondose monochasia. **Flowers** ± regular, bisexual, protandrous. **Calyx** lobes (3)4 or 5, accrescent. **Corolla** campanulate, epigynous, (3)4- or 5-lobed. **Stamens** (3)4 or 5, free; filament bases almost linear to broadly winged, ciliate or glabrous. **Ovary** inferior, 2-locular; ovules many; style shorter than corolla, 2-lobed, upper part with pollen-collecting hairs, lower part glabrous or hairy; 2 glands sometimes present at base of style lobes. **Capsule** thin-walled, indehiscent. **Seeds**

many; testa sulcate, often with hair-like projections. x = 9 (1 report).

Species 2, Africa and Madagascar; 1 species: *Gunillaea rhodesica* (Adamson) Thulin, N Namibia and Botswana.

Merciera A.DC. 8661000

Candolle: 369, t. 5 (1830); Adamson: 157 (1954).

Dwarf undershrubs or shrublets, glabrous or hairy. **Leaves** somewhat ericoid, dense, often fascicled, ciliate. **Flowers** solitary, axillary, shortly pedicellate or subsessile; bracts 2. **Calyx** much shorter than corolla, glabrous, 4- or 5-lobed; tube very short or shallowly campanulate; lobes lanceolate or oblong-lanceolate. **Corolla** 4- or 5-lobed; tube long, slender, gradually widening upwards; lobes sometimes unequal, shorter than tube, sometimes glandular on inner face. **Stamens** 4 or 5, free from corolla, included; filaments filiform, pilose ± in the middle; anthers 2-thecous, linear. **Ovary** inferior, turbinate or subglobose, 1-locular; or imperfectly 2-locular, with 4 erect ovules, pilose; style filamentous, exserted, swollen at base; stigma ellipsoid or clavate, of 2 fleshy, glandular or hairy lobes. **Fruit** a capsule, 1-seeded by abortion, crowned with persistent calyx.

Species 5, Western Cape.

Microcodon A.DC. 8677000

Candolle: 127, t. 19 (1830); Sonder: 564 (1865).

Herbs, usually small, somewhat wiry annuals. **Leaves** alternate or subopposite, linear. **Flowers** in terminal corymbs or heads. **Calyx** as long as or shorter than corolla tube, 5-partite; lobes linear, subulate, sometimes ciliate. **Corolla** 5-lobed, glabrous; tube cylindric; lobes ovate or oblong, shorter than tube. **Stamens** 5, arising at base of corolla tube, included; filaments linear, shorter than anthers, pilose; anthers linear. **Ovary** inferior or half-inferior, 5-locular, with many ovules in each locule, glabrous or hairy; style terete, included, sparsely hairy on lower portion; stigma 5-lobed. **Fruit** a capsule, loculicidally 5-valved.

Species 4; mainly Western but also Northern Cape.

Namacodon Thulin 8663010

Thulin: 173 (1974).

Erect shrublets, much branched from base. **Leaves** alternate, sessile, flat, lanceolate, margin slightly revolute. **Flowers** terminal, solitary; pedicel elongating in fruit, protandrous. **Calyx**: tube linear or tapering at each end, with 3 longitudinal furrows, glabrous; lobes 5, linear, acute, entire, glabrous. **Corolla** campanulate, epigynous, blue, lobes 5, united almost halfway. **Stamens** 5, free, filament bases ciliate-pubescent; anther connective with apical appendage. **Ovary** inferior, 3-locular, ovules many; style shorter than corolla, with pollen-collecting hairs, style lobes 3. **Capsule** elongated, cylindrical-fusiform, dehiscing septicidally by 3 longitudinal splits. **Seeds** many, broadly elliptic, strongly compressed, almost smooth, brown, glossy.

Species 1: *Namacodon schinzianum* (Markgr.) Thulin, mountains in central Namibia.

Prismatocarpus L'Hér. 8663000

L'Héritier de Brutelle: 1, t. 3 (1789); Adamson: 93 (1951).

Subshrubs, sometimes perennial herbs. **Leaves** alternate, often somewhat ericoid. **Flowers** solitary or glomerate at ends of branches or in dichotomous panicles. **Calyx** shorter to longer than corolla tube, 5-lobed or 5-partite, glabrous or hairy; lobes variable. **Corolla** 5-lobed, glabrous; tube campanulate or subcylindric, expanding above; lobes elliptic-lanceolate to obovate-oblong. **Stamens** 5, free from corolla, included or shortly exserted; filaments long, linear and pilose or short and dilated at base; anthers 2-thecous, linear. **Disc** glandular, swollen, or 0. **Ovary** cylindric, 2-locular, with many ovules in each locule, usually hairy; style linear or thick and terete, sometimes with 2 glands below stigma, included or exserted; stigma usually 2-lobed, rarely cylindric. **Fruit** a capsule, splitting from top to base into 5 segments. **Seeds** oblong, compressed, dotted.

Species 30, mostly Western Cape, also Northern and Eastern Cape.

Rhigiophyllum Hochst. 8664000

Hochstetter: 232 (1842); Sonder: 597 (1865).

Shrublets, rigid. **Leaves** small, broadly ovate, glabrous, densely imbricate in 4 rows, squarrose, entire. **Flowers** in terminal heads, intermixed with rigid, leaf-like bracts; bracteoles 2. **Calyx** much shorter than corolla tube, glabrous; tube shallowly basin-shaped; lobes lanceolate. **Corolla** 5-lobed, glabrous; tube long, cylindric; lobes lanceolate. **Stamens** 5, arising in corolla throat, scarcely exserted; filaments linear, shorter than anthers; anthers 2-thecous, linear. **Ovary** obconic, 3-locular, with several ovules in each locule on apical placentas; style slender, terete, exserted; stigma of 3 recurved, fleshy lobes. **Fruit** a capsule, dehiscing through a terminal lid, crowned with persistent style base.

Species 1: *Rhigiophyllum squarrosum* Hochst., Western Cape.

Roella L. 8662000

Linnaeus: 170 (1753); Adamson: 129 (1951).

Undershrubs, rarely herbs. **Leaves** somewhat ericoid, often recurved, sometimes those under flowers pinnately spinous-lobed. **Flowers** sessile, solitary or glomerate at ends of branches. **Calyx** longer than corolla tube, (4)5-lobed; tube shallowly saucer-shaped; lobes lanceolate-linear to ovate, entire or pectinate or ciliate in upper half. **Corolla** (4)5-lobed; tube usually campanulate; lobes elliptic or oblong. **Stamens** (4)5, free from corolla tube; included or subexserted; filaments expanded at base into an oblong or linear, ciliated, scale-like structure; anthers 2-thecous, free, linear or oblong-linear. **Disc** annular or swollen. **Ovary** 2-locular, with many ovules in each locule; style broadly linear or terete, sometimes hairy at base or glandular above, sometimes with 2 glands at base of stigma, included; stigma of 2 lobes either recurved, somewhat fleshy and often clavate, or oblong and glandular. **Fruit** a capsule, 2-locular, perforated by base of style and appearing as if covered by an apical lid, at length dehiscing by hole at apex, without valves. **Seeds** many, angled, scabrous, thick.

Species 25, mostly Western Cape, 1 in KwaZulu-Natal and Eastern Cape.

Siphocodon Turcz. 8667000

Turczaninow: 175 (1852); Sonder: 596 (1865).

Slender undershrubs with wiry branches. **Leaves** sparse, subulate, scale-like. **Flowers** in few-flowered racemes or racemose panicles. **Calyx** shorter than corolla tube, 5-lobed, glabrous; tube shallowly saucer-shaped; lobes lanceolate. **Corolla** 5-lobed, glabrous; tube cylindric; lobes oblong or ovate-lanceolate, shorter than tube. **Stamens** 5, arising high in corolla tube, included; filaments free, slightly shorter than anthers; anthers 2-thecous, oblong. **Ovary** inferior, 2- or 3-locular, 2, 4 or

5 ovules in each locule; style terete, gradually thinner upwards; stigma of 3 lanceolate, glandular lobes. **Fruit** a capsule, crowned with persistent calyx, opening transversely and lid falling with portion of calyx.

Species 2, Western Cape.

Theilera E.Phillips 8677010

Phillips: 368 (1932).

Shrublets with lax, slender branches. **Leaves** alternate, fascicled, linear, erect or recurved. **Flowers** axillary, solitary, sessile. **Calyx** much shorter than corolla tube, 5-partite, glabrous; lobes linear. **Corolla** 5-lobed, glabrous; tube cylindric; lobes oblong or ovate-oblong, shorter than tube. **Stamens** 5, free from corolla, included; filaments thread-like, longer than anthers, scantily pilose; anthers 2-thecous, linear. **Ovary** inferior, 3(4)-locular, with many ovules in each locule, on basal placentas; style terete, exserted, glabrous; stigma club-shaped, with 3 glandular lobes. **Fruit** a capsule opening by terminal valves.

Species 1: *Theilera guthriei* (L.Bolus) E.Phillips, Western and Eastern Cape.

Treichelia Vatke 8665000

Vatke: 700 (1874); Adamson: 745 (1950).

Leptocodon Sond.: 584 (1865) name illegitimate.

Dwarf, coarse, annual herbs. **Leaves** linear, with few remote teeth and with few rigid cilia at base. **Flowers** in dense, terminal subheads, intermixed with long, linear bracts. **Calyx** shorter than corolla tube, 5-lobed, hairy; tube subcampanulate. **Corolla** 5-lobed, glabrous; tube cylindric, globose at base; lobes lanceolate. **Stamens** 5, free from corolla tube, included; filaments short, linear, expanded and ciliate at base; anthers 2-thecous, linear. **Ovary** subglobose, 2-locular, with several ovules in each locule, hairy; style slender, terete, swollen into a large, subglobose, solid ball at base; stigma 2-lobed. **Fruit** a capsule, cylindric, several-seeded, covered by solid, conical base of style.

Species 1: *Treichelia longebracteata* (H.Buek) Vatke; Western Cape: Cape Peninsula.

Wahlenbergia Schrad. ex Roth 8668000

Schrader ex Roth: 399 (1821) name conserved; Sonder: 566 (1865); Von Brehmer: 9 (1915); Thulin: 1 (1975); Lammers: 333 (1995); Welman: 157 (1996).

Lightfootia L'Hér.: 4, t. 4 (1789) name illegitimate. *Cervicina* Delile: 7, t. 5, f. 2 (1813) name rejected. *Cephalostigma* A.DC.: 117 (1830).

Annual or perennial herbs, sometimes shrublets. **Leaves** alternate, rarely opposite. **Flowers** solitary, on axillary or terminal peduncles or sometimes panicled. **Calyx** usually shorter than corolla tube (3- or 4-)5-partite; segments usually linear or subulate. **Corolla** (3- or 4-)5-lobed to ± middle; tube funnel-shaped, or campanulate, sometimes widened at base; lobes variable in shape, usually shorter than tube. **Stamens** 5, free from corolla, included; filaments linear, sometimes pilose, often expanded at base and 2-lobed; anthers 2-thecous, linear, sometimes sagittate. **Ovary** subglobose, 2–5-locular, with many ovules in each locule, glabrous or hairy, sometimes glandular; style terete, included or exserted, sometimes with cone-shaped base; stigma of 2–5 glandular, usually recurved, lobes. **Fruit** a capsule, dehiscing loculicidally into as many valves as there are locules. $x = 9$ (8) (aneuploids, high polyploidy).

Species ± 200, mainly southern hemisphere; nearly 150 in sthn Afr.; all regions.

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Canellaceae

(Magnoliidae—Magnoliales)

Compiled by C.L. Bredenkamp

Trees, evergreen, glabrous, often aromatic. **Leaves** alternate, simple, entire, gland-dotted, penninerved, dark green, shiny above; stipules 0. **Inflorescence** axillary with flowers solitary or in abbreviated 3-flowered cymes. **Flowers** regular, bisexual. **Sepals** 3, imbricate, persistent, suborbicular. **Petals** 10, free, in 2 whorls, the outer larger and thicker than inner, pellucid gland-dotted. **Stamens** 10, hypogynous; filaments united in a tube; anthers sessile on upper part of tube, about as long as tube, linear, with fleshy apical appendage and with longitudinal extrorse dehiscence. **Ovary** superior, 1-locular; ovules 10–30 in 1 or 2 rows on 5 parietal placentas; style ± enclosed in staminal tube, truncate at apex, bearing 5 oval stigmatic patches round the sides, thick; stigmas 2–5. **Fruit** a berry; pericarp coriaceous. **Seeds** 2–many, shining; endosperm oily and fleshy.

Genera 5, species ± 11 , tropical North and South America, east tropical Africa and Madagascar; sthn Afr.: genus 1, species 1.

Codd: 39 (1976).

Warburgia Engl. 5256000

Engler: 276 (1895) name conserved; Codd: 40 (1976).

Description as for family.

Species 3, Africa; 1 in sthn Afr.: *Warburgia salutaris* (G.Bertol.) Chiov., Northern Province, Mpumalanga, KwaZulu-Natal.

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*Cannabaceae

(Dilleniidae—Urticales)

Compiled by M. Jordaan

Erect, tall, annual, aromatic herbs without latex, dioecious, rarely monoecious; most parts of plant with minute adpressed swollen-based glandular hairs. Male and female plants dimorphic: males taller and more slender with longer narrower leaflets, inflorescence sparsely leafy, plant dying soon after flowering; female shorter, more robust, inflorescence densely leafy, plant living several months after pollination. **Leaves** alternate (opposite at stem base), petiolate, palmately compound or lobed, leaflets uneven in size, serrate; stipules lateral, linear, acute, persistent. **Male inflorescences** axillary, much-branched, lax, cymose panicles, bristly-hairy, exceeding leaves but bearing few scattered leaves. **Male flowers** small, pedicellate, regular; perianth uniseriate, lobes 5, free, imbricate, greenish or whitish, boat-shaped, spreading or reflexed; stamens 5, opposite perianth lobes, erect in bud, pendulous at maturity, dehiscence longitudinal, basipetal; filaments short; pistillode 0. **Female inflorescences** axillary, short, compact, not exceeding leaves, few-flowered. **Female flowers** in pairs, each with stipule-like bract and small green organ ('bracteole' or 'calyx') completely enveloping ovary and loosely enclosing mature fruit, forming basally swollen tubular sheath acuminate at apex and covered with fine hairs and short-stalked or sessile resinous glands; perianth thin, undivided, tightly enveloping ovary and mature fruit (often reduced or absent in cultivated forms), marbled with light and dark areas; ovary superior, sessile, ± globose, 1-locular; ovule solitary, anatropous, bitegmic, crassinucellar and pendent from near apex of locule; style short; stigma branches 2, long, filiform, densely pubescent, caducous. **Fruit** a globular to ovoid achene tightly covered by thin crustaceous perianth, reticulate venation of surface beneath perianth visible. **Seed** 1; endosperm sparse, fleshy, oily; embryo strongly curved or coiled; cotyledons fleshy. $x = 10$ (polyploidy).

Genera 2, native to temperate parts of the northern hemisphere, Eurasia to SE Asia and North America; 1 genus with 1 species naturalised in Africa.

Endlicher: 286 (1837); Candolle: 30 (1869); Bentham: 356 (1880); Engler: 96 (1888); Rendle: 16 (1916); Wilmot-Dear: 10 (1991); Kubitzki: 204 (1993).

*Cannabis L. 1973000

Linnaeus: 1027 (1753); Linnaeus: 453 (1754); Adanson: 376 (1763); Lamarck: 694 (1785); Jussieu: 400 (1789); Candolle: 30 (1869); Baillon: 159 (1875); Bentham: 357 (1880); Engler: 96 (1888); Rendle: 16 (1916); Burtt Davy: 445 (1932); Tutin: 67 (1964); Hendrcrson & Anderson: 70 (1966); Miller: 185 (1970); Emboden: 304 (1974); Schultes *et al.*: 337 (1974); Small & Cronquist: 405 (1976); Anderson: 61 (1980); Wilmot-Dear: 10 (1991); Kubitzki: 205 (1993); Small: 381 (1997).

Description as for family.

Species 1: **Cannabis sativa* L. with 3 varieties, 'Dagga', probably originally from Asia and now widely cultivated and naturalised worldwide in warmer areas.

Due to its long association with man the genus shows considerable variation in growth form, achene size, and chemical content. This variation has led to various taxonomic interpretations. Emboden (1974) and Schultes *et al.* (1974) adduce good reasons for distinguishing three species. Small & Cronquist (1976) interpret *Cannabis* as a variable monotypic (**C. sativa* L.) genus with 4 infraspecific taxa. Anderson (1980) considers *Cannabis* as comprising 3 species. Wilmot-Dear (1991) considers *Cannabis* as comprising 1 very variable species with 3 infraspecific taxa.

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Capparaceae

(Dilleniidae—Capparidales)

Compiled by L.L. Dreyer & M. Jordaan

Herbs, shrubs or trees, sometimes scandent. **Leaves** alternate, very rarely opposite, simple or 3–5-foliolate, sometimes crowded on abbreviated shoots, rarely underdeveloped or soon deciduous; stipules, when present, setaceous or spinescent. **Inflorescences** terminal or axillary, racemose, corymbose or paniculate, or flowers solitary and axillary, sometimes on abbreviated shoots or arising on old wood. **Flowers** bisexual, very rarely unisexual, regular or rarely irregular, usually 4-merous. **Receptacle** cupular, campanulate, infundibular or cylindrical; disc various or 0. **Sepals** 3 or 4(5). **Petals** (0–3)4(rarely more), free. **Stamens** 4–many, arising from base or high up on androphore (torus), sometimes accompanied by staminodes; filaments free, usually terete; anthers 2-thecous, opening by longitudinal slits, sometimes with small, apical appendage. **Ovary** superior, sessile or more usually supported on long or short gynophore, 1-locular, with 2 parietal placentas, sometimes 2-locular by division of placentas, or multilocular; ovules few to many, often in 2 rows; style 1, short or 0; stigma often sessile, capitate. **Fruit** a capsule or berry, usually stipitate. **Seeds** reniform or subglobose, without endosperm.

Genera 45, species 675, native to warm and tropical countries, often in arid regions; sthn Afr.: genera 8, species 45.

Sonder: 54 (1860); Gilg & Gilg-Benedict: 144 (1915); Pax & Hoffmann: 146 (1936); Wild: 194 (1960); Elffers *et al.*: 1 (1964); Roessler: 1 (1966); Killick: 118 (1970); Fici: 37 (1993); A.P.G.: 549 (1998) included in Brassicaceae.

Key to genera

1a Herbs; fruit a cylindrical, dehiscent capsule ..... **Cleome**
1b Woody plants; fruit a globose, ellipsoid, oblong or cylindrical, usually indehiscent berry:
2a Androphore elongated, longer than sepals:
3a Leaves 3-foliolate; upper and lower sepals not enclosing lateral ones; androphore with staminodes at its base; fruit globose ..... **Cladostemon**
3b Leaves simple; upper and lower sepals enclosing lateral ones; androphore with a conspicuous nectary at its base; fruit cylindrical ..... **Cadaba**
2b Androphore short, not as long as sepals:
4a Calyx rupturing transversely; fruit with 8–10 longitudinal ribs ..... **Thilachium**
4b Calyx not rupturing transversely; fruit without ribs:
5a Receptacle or calyx not tubular:
6a Branches with stipulate spines; sepals imbricate, orbicular, rarely ovate ..... **Capparis**
6b Branches without spines; sepals valvate, lanceolate ..... **Boscia**
5b Receptacle or calyx tubular:
7a Flowers in abbreviated racemes on old wood; calyx lobes not or scarcely spreading; androphore very short; disc absent ..... **Bachmannia**
7b Flowers solitary, fascicled or in terminal racemes or corymbs; sepals spreading; androphore about equalling the receptacle; disc present ..... **Maerua**

Bachmannia Pax 3097000

Pax: 177 (1897); Gilg: 204 (1902); Gilg & Gilg-Benedict: 175 (1915); Pax & Hoffmann: 171 (1936); Phillips: 355 (1951); Killick: 142 (1970).

Shrubs or small trees. **Leaves** alternate, digitately (1)3- or 4(5)-foliolate; leaflets elliptic or obovate, large, coriaceous. **Inflorescence** 2–6-flowered, abbreviated racemes on old wood. **Calyx**: tube campanulate, intruse at base; lobes 4 or 5, oblong, mucronate, veined; disc 0. **Petals** 0. **Stamens** 13–18, on a short androphore; filaments terete; anthers oblong. **Ovary** on a long, terete gynophore, ellipsoid, with ± 7 ovules; style 0; stigma capitate. **Fruit** subglobose.

Species 1, Mozambique and sthn Afr.: *Bachmannia woodii* (Oliv.) Gilg, KwaZulu-Natal and Eastern Cape.

Boscia Lam. 3106000

Lamarck: t. 395 (1793) name conserved; Sonder: 60 (1860) in part; Gilg & Gilg-Benedict: 203 (1915); Pax & Hoffmann: 188 (1936); Phillips: 356 (1951); Wild: 229 (1960); Elffers *et al.*: 50 (1964); Roessler: 2 (1966); Tölken: 59 (1969a); Tölken: 150 (1970); Fici: 44 (1993).

Trees or shrubs, with spreading branches often ending in spines, usually with a light yellowish or greyish bark. **Leaves** fascicled, alternate or irregularly spaced, simple, entire, coriaceous, petiolate. **Inflorescence** terminal or axillary, pedunculate or sessile racemes, panicles or corymbs, sometimes flowers fascicled; bracts setaceous or linear, entire, trifid, often caducous. **Sepals** 4, fleshy, scarcely fused at base with fleshy corona, valvate, yellowish green. **Petals** usually 0, rarely 1–4, spathulate. **Stamens** 5–22, hardly fused in an androphore. **Ovary** on a gynophore up to 8 mm long, ovoid, 1-locular, with (2)4–8 ovules on two parietal placentas. **Fruit** a berry with clusters of stone cells in exocarp. **Seeds** usually 1 or 2, usually with a pustulate or colliculate surface.

Species 37, throughout Africa and 1 species in Arabian Peninsula; 9 in sthn Afr., widespread.

Cadaba Forssk. 3109000

Forsskål: 67 (1775); Sonder: 59 (1860); Pax: 209 (1891); Gilg & Gilg-Benedict: 222 (1915); Phillips: 356 (1951); Roessler: 4 (1966); Marsh: 171 (1970); Fici: 46 (1993).

Schepperia Neck.: 67 (1790); Sonder: 59 (1860).

Shrubs, unarmed or branches becoming spine-tipped; branches sometimes subsucculent, leafless, scurfy. **Leaves** simple, solitary, alternate or fascicled, glabrous to farinose, with margins usually entire, sometimes rudimentary or undeveloped. **Flowers** solitary or fascicled in leaf axils or in terminal, leafless corymbs. **Sepals** 4, subequal or unequal in 2 series, upper and lower valvate and enclosing lateral sepals. **Petals** 0. **Stamens** usually 5–8(–13); androphore with basal, variously shaped, con-

spicuous nectary. **Ovary** on an elongated gynophore at least 4 mm long; cylindrical, 1-locular with many ovules attached on 2(–4) placentas; stigma capitate, sessile. **Fruit** indehiscent or tardily dehiscent, long-cylindrical. **Seeds** reniform; testa ridged or smooth, often embedded in scarlet matrix. $x = 8, 9$ (aneuploids, polyploidy).

Species 30, Old World tropics including Arabian Peninsula, India, Australia, Madagascar and islands of the Indian Ocean; 4 in sthn Afr., widespread.

Capparis L. 3101000

Linnaeus: 503 (1753); Linnaeus: 222 (1754); Sonder: 61 (1860) in part; Gilg & Gilg-Benedict: 184 (1915); Pax & Hoffmann: 172 (1936); Phillips: 355 (1951); Wild: 235 (1960); Elffers *et al.*: 58 (1964); Tölken: 63 (1969b); Tölken: 144 (1970); Wild & Gonçalves: 53 (1973); Fici: 52 (1993).

Scramblers or shrubs with long branches usually with a pair of stipular spines at base of leaf. **Leaves** alternate, simple, entire, petiolate. **Inflorescence** terminal or axillary, paniculate, racemose, corymbose or umbellate, rarely with single, axillary flowers; bracts usually 0. **Sepals** 4, broadly ovate to orbicular, often with outer and inner ones unequal in size, convex, imbricate, free or nearly so. **Petals** 4, oblong or obovate, not clawed, usually white or cream becoming brownish. **Stamens** 6–many, free. **Ovary** on a gynophore at least 5 mm long, ovoid to almost spherical, with 4–many ovules on 2–many placentas; stigma indistinct, rarely capitate, on a style usually less than 1 mm long. **Fruit** a berry, spherical to cylindrical. **Seeds** 1–many, embedded in a fleshy pulp; embryo convolute. $x = 6, 10$ (aneuploids).

Species ± 250, widespread in the tropical and subtropical areas of the world; 5 in sthn Afr., widespread.

Cladostemon A.Braun & Vatke 3099000

Braun & Vatke: 866 (1877); Pax & Gilg: 185 (1895); Gilg & Gilg-Benedict: 183 (1915); Pax & Hoffmann: 171 (1936); Wild: 211 (1960); Elffers *et al.*: 70 (1964); Killick: 140 (1970); Williams: t. 2079 (1992).

Shrubs or small trees, glabrous. **Leaves** alternate, 3-foliolate; petiolules articulated at base; stipules minute, inconspicuous. **Flowers** in lax corymbose racemes. **Sepals** 4, free; receptacle not developed into a disc. **Petals** 4, the 2 adaxial larger, unguiculate. **Stamens** 5–8; adaxial ones united in a much elongated androphore; abaxial ones (staminodes) shortly united at base and arising from base of androphore. **Ovary** on a gynophore attached to androphore, stout in fruit, ellipsoid, 2-locular with 2 multi-ovulate parietal placentas; stigma peltate. **Fruit** globose, large, with long stalk; pericarp coriaceous. **Seeds** many, subglobose; cotyledons large, fleshy, curved.

Species 1, Mozambique, Zimbabwe; 1 in sthn Afr.: *Cladostemon kirkii* (Oliv.) Pax & Gilg, Swaziland and KwaZulu-Natal.

Cleome L. 3082000

Linnaeus: 671 (1753); Linnaeus: 302 (1754); Sonder: 55 (1860); Gilg & Gilg-Benedict: 145 (1915); Roessler: 6 (1966); Codd & Kers: 119 (1970); Wild & Gonçalves: 12 (1973); Thulin & Kers: 53 (1993b).

Polanisia Raf.: 267 (1818); Sonder: 56 (1860). *Gynandropsis* DC.: 237 (1824); Sonder: 55 (1860); Oliver: 81 (1868); Pax & Gilg: 184 (1895); Wild: 205 (1960); Roessler: 12 (1966). *Tetratelia* Sond.: 58 (1860); Pax & Hoffmann: 219 (1936). *Dianthera* Klotzsch ex Sond.: 57 (1860).

Annual or perennial herbs, often somewhat woody at base; stems usually striate, glabrous to viscid, glandular-hispid and aromatic. **Leaves** alternate, simple or digitately 3–13-foliolate, petiolate; leaflets usually narrow and usually entire. **Inflorescence** a terminal raceme. **Flowers** usually irregular. **Sepals** 4, usually free or almost so, persistent or deciduous, usually narrow and often glandular-pubescent. **Petals** 4, sessile or clawed, equal or unequal, usually longer than sepals. **Stamens** 4–many, all fertile or some sterile, borne on a small torus or receptacle or on a long or short androgynophore; filaments equal or unequal, usually declinate; anthers 2-thecous, usually oblong or narrowly oblong, sometimes with a small, apical projection. **Ovary** sessile or with a short gynophore, with many ovules on 2 parietal placentas; style short or 0; stigma capitate or truncate. **Fruit** an oblong or linear capsule, often borne on an elongated gynophore, opening by 2 valves separating from seed-bearing placentas, terminating in persistent style; valves glabrous to glandular-pubescent, smooth or strongly longitudinally nerved. **Seeds** reniform to almost circular in outline, surface almost smooth or reticulate-foveolate to transversely rugose, glabrous or pubescent. $x = 10$ (aneuploids, high polyploidy).

Species ± 150, cosmopolitan in tropical and warmer regions of the world; 21 in sthn Afr., widespread.

Maerua Forssk. 3112000

Forsskål: 104 (1775); Gilg & Gilg-Benedict: 232 (1915); Pax & Hoffmann: 195 (1936); Phillips: 357 (1951); Wild: 216 (1960); Elffers *et al.*: 24 (1964); Roessler: 13 (1966); Killick: 39 (1969); Killick: 159 (1970); Thulin & Kers: 38 (1993a).

Niebuhria DC.: 243 (1824). *Courbonia* Brongn.: 901 (1860); Phillips: 356 (1951); Wild: 214 (1960).

Shrubs, trees, scramblers, or climbers, without spines, glabrous or pubescent. **Leaves** alternate or sometimes crowded on abbreviated shoots, simple or 3–5-foliolate, sessile or petioled, variously shaped, margins entire. **Inflorescence** axillary, solitary or fascicled or terminal racemes or corymbs. **Receptacle** cylindrical, infundibular or campanulate, inner margin often produced into a coronate, annular, lobed or toothed disc. **Sepals** 4. **Petals** 0–4, arising from mouth of receptacle between much larger sepals. **Stamens** many, borne on androphore (torus) equal or exceeding receptacle, exserted; anthers oblong, basifixed, with longitudinal dehiscence. **Ovary** cylindrical or ellipsoid, 1- or 2-locular, with 4–many ovules in 2 rows on 2 placentas; stigma sessile, capitate. **Fruit** globose, ovoid, ellipsoid, oblong-ellipsoid or cylindrical, sometimes moniliform. **Seeds** subglobose, sometimes angled, smooth or rugose. $x = 10$ (polyploidy).

Species ± 100, tropical Asia, India and Africa; 11 in sthn Afr., widespread.

Thilachium Lour. 3113000

Loureiro: 342 (1790); Pax & Hoffmann: 201 (1936); Wild: 213 (1960); Elffers *et al.*: 81 (1964); Killick: 175 (1970); Thulin: 53 (1993).

Shrubs, small trees or scramblers. **Leaves** alternate, simple or 3-foliolate, petiolate; stipules often caducous. **Flowers** in corymbose racemes, terminal or axillary. **Calyx** closed in bud, later rupturing transversely, 'cap' often remaining attached on one side. **Petals** 0. **Stamens** many, on a columnar androphore. **Ovary** on a well-developed gynophore, 1-locular, appearing multilocular owing to development of spurious dissepiments from 6–10 placentas, multiovulate; stigma sessile. **Fruit** ellipsoid or oblong, with 8–10 longitudinal ribs. **Seeds** many.

Species ± 10, East African coast and Madagascar; 1 in sthn Afr.: *Thilachium africanum* Lour., Mpumalanga, Swaziland and KwaZulu-Natal.

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Caryophyllaceae

(Caryophyllidae—Caryophyllales)

Compiled by M. Jordaan

Annual or perennial herbs, or subshrubs, rarely shrubs; plants rarely monoecious, gynodioecious or dioecious; stems often swollen at nodes, often dichotomously branched. **Leaves** opposite, decussate or apparently whorled, very rarely alternate, simple, entire, often slightly connate at base, sometimes succulent; stipules, when present, scarious, sometimes connate at base. **Inflorescences** mostly dichasial, sometimes monochasial, rarely flowers solitary. **Flowers** bisexual or rarely unisexual, regular, hypogynous or perigynous, sometimes obdiplostemonous, commonly protandrous. **Sepals** (4)5, free or ± connate, imbricate, rarely valvate, sometimes subtended by bracts. **Petals** (0)(4)5, or rarely more, sometimes minute, free, entire, emarginate, bifid or lacerate, clawed or not; aestivation contorted or rarely imbricate. **Stamens** (1–4)5–10(11), in 1 or 2 whorls; filaments free or basally connate, or additionally connate with petals, then forming a tube which may be adnate to a gynophore; anthers 2-thecous, versatile, dehiscing longitudinally by means of slits; sometimes staminodes present. **Ovary** superior, sometimes half-inferior, 2–5-carpellate, 1-locular, occasionally incompletely 2–3-locular below middle; ovules 1 to many, bitegmic, hemitropous to campylotropous, rarely nearly anatropous, on a free-central placenta or basal when 1; styles free or connate at base; stigmas as many as carpels. **Fruit** either a capsule, splitting from apex with as many or twice as many valves or teeth as there are carpels, or a nutlet, sometimes enclosed in persistent calyx. **Seeds** small, globose to pyriform or reniform, usually with variously sculptured testa, rarely smooth; endosperm little or 0; embryo peripherally curved around starchy perisperm, sometimes ± straight, rarely spiral.

Genera ± 80, species ± 2200, mostly north, temperate and cold regions, with a centre in the Mediterranean and Irano-Turanean region; sthn Afr.: genera 22 (11 exotic), species 72 (18 exotic).

In agreement with Bittrich (1993) Illecebraceae is included in Caryophyllaceae.

Jussieu: 299 (1789) name conserved; Candolle: 351 (1824); Seringe: 351 (1824); Fenzl: 955 (1840); Bentham: 55 (1862a); Hooker: 12 (1880); Pax: 61 (1889); Lüders: 1 (1907); Pax & Hoffmann: 275 (1934); Chaudhri: 1 (1968); Friedrich: 763 (1979a); Friedrich: 749 (1979b); Bittrich: 206 (1993).

Classification of Caryophyllaceae (adapted from Mabberley 1997)

I. Subfamily PARONYCHIOIDEAE (Stipules present; petals 0 or small; sepals free; styles partly fused):
   1. Tribe **Polycarpeae** (Fruit a capsule; leaves opposite): *Drymaria*, *Krauseola*, *Polycarpaea*, *Polycarpon*, **Spergula*, *Spergularia*
   2. Tribe **Paronychieae** (Fruit a nutlet; leaves opposite): *Herniaria*, **Paronychia*, *Pollichia*
   3. Tribe **Corrigioleae** (Fruit a nutlet; leaves alternate): *Corrigiola*

   Note: tribes 2 and 3 are sometimes (also by Dyer 1975) placed in the family Illecebraceae.

II. Subfamily ALSINOIDEAE (Stipules 0; sepals free; styles ± free; fruit a capsule or rarely a nutlet: *Scleranthus*):
   1. Tribe **Alsineae** (Fruit a capsule; petals mostly 4 or 5, sometimes 0; styles usually 3–5): **Arenaria*, *Cerastium*, **Holosteum*, **Moenchia*, **Sagina*, **Stellaria*

2. Tribe **Scleranthеae** (Fruit a nutlet; petals 0; styles 2): **Scleranthus*

III. Subfamily CARYOPHYLLOIDEAE (Stipules 0; calyx tubular; styles ± free):

1. Tribe **Caryophylleae** (Styles 2; capsule opening by 4(–6) teeth): *Dianthus*, **Petrorhagia*, **Vaccaria*
2. Tribe **Sileneae** (Styles 3–5; capsule opening by as many or twice as many teeth as styles): **Agrostemma*, *Silene*

Key to genera

1a Leaves with stipules; petals 0 or small; styles at least partly fused:
2a Leaves alternate: **Corrigiola**
2b Leaves opposite:
3a Fruit a nutlet:
4a Infructescence succulent, berry-like, translucent white; leaves often in false whorls **Pollichia**
4b Infructescence not succulent; leaves opposite, upper ones sometimes alternate by reduction; stipules sometimes large:
5a Stipules conspicuous; sepals often hooded and with a dorsal, subapical awn ***Paronychia**
5b Stipules inconspicuous; sepals mostly planoconcave, not hooded or awned **Herniaria**
3b Fruit a capsule:
6a Leaves linear to filiform; plants often glandular-viscid:
7a Leaves pseudoverticillate; petals white; stipules 4 per node; styles 5(3) ***Spergula**
7b Leaves decussate; petals white or pink; stipules 2, connate and sheathing the node; styles 3(5) **Spergularia**
6b Leaves broader than above; plants usually not glandular-viscid:
8a Petals 2–4-lobed or partite; leaves ovate, 3–7-nerved from base **Drymaria**
8b Petals entire, emarginate or dentate; leaves rarely ovate, 1-nerved at base:
9a Sepals 9–13; petals 5–8; capsule 5-valved **Krauseola**
9b Sepals 5; petals 3; capsule 3-valved:
10a Sepals winged up back and sharply prominent in fruit **Polycarpon**
10b Sepals scarious, long-acuminate **Polycarpaea**

1b Leaves without stipules; petals often conspicuous, rarely 0 or minute (**Sagina*, **Scleranthus*); styles free:
11a Sepals free or only basally connate; petals and stamens basally free; petal venation mostly open or semiclosed; episepalous stamens often with a nectary gland at abaxial base:
12a Fruit a nutlet; perianth becoming crustaceous with age ***Scleranthus**
12b Fruit a capsule; perianth not becoming crustaceous with age:
13a Fruit splitting into as many valves as there are styles ***Sagina**
13b Fruit splitting into twice as many valves as there are styles:
14a Petals entire, emarginate or fimbriate, rarely 0:
15a Styles usually 2 ***Holosteum**
15b Styles usually 3 or 4:
16a Styles usually 3 ***Arenaria**
16b Styles usually 4 ***Moenchia**
14b Petals deeply 2-fid or bipartite:
17a Stamens 5; styles 3 or occasionally 2 ***Stellaria**
17b Stamens 10; styles 5 or occasionally 4 **Cerastium**
11b Sepals connate, often for most of their length; petals mostly clawed, petals and stamens basally ± connate, petal venation ± closed; abaxial base of episepalous stamens without nectary glands:
18a Calyx tube with 1–12 pairs of bracts at base:
19a Bracts green, much shorter than calyx **Dianthus**
19b Bracts membranous, as long as and clasping the calyx ***Petrorhagia**
18b Calyx tube without bracts at base:
20a Calyx tube 5-winged; styles 2 ***Vaccaria**
20b Calyx tube with 10, 20 or 30 ± prominent veins or ribs; styles 3 or 5:
21a Calyx lobes longer than petals ***Agrostemma**
21b Calyx lobes shorter than petals **Silene**

*Agrostemma L. 2488000

Linnaeus: 435 (1753); Linnaeus: 198 (1754); Jussieu: 302 (1789); Candolle: 386 (1824); Sonder: 129 (1860); Pax: 70 (1889); Burtt Davy: 150 (1926); Chater: 157 (1964a); Henderson & Anderson: 126 (1966); Zohary: 80 (1966); Friedrich: 1175 (1979a); Bittrich: 233 (1993); Greuter: 106 (1995).

Tall annual herbs, with erect, villous stems. **Leaves**: radical ones spatulate, cauline ones opposite and usually linear; stipules 0. **Inflorescences** terminal or axillary lax dichasia, or flowers usually solitary. **Flowers** bisexual, conspicuous, long-pedicelled, white, pink or purple. **Calyx** tube prominently 10-ribbed, with 5 narrow spreading teeth as long as or longer than tube, coriaceous, campanulate. **Petals** 5, often shorter than calyx; limb entire, gradually tapering into claw. **Stamens** 10, the 5 opposite the petals sometimes adnate to claw. **Disc** basin-shaped, lobed on margin. **Ovary** 1-locular, sometimes 3-locular towards base; ovules many on free-central placenta; styles (4)5, hairy, alternisepalous, long, linear, pubescent. **Fruit** a capsule (4)5-valved. **Seeds** many, reniform with hard, dark brown to black testa, tuberculate. $x = 12$ (polyploidy).

Species 2, native of Mediterranean and temperate Eurasia; noxious weeds of fields, now widely dispersed; **Agrostemma githago* L., introduced into sthn Afr., has become naturalised.

*Arenaria L. 2443000

Linnaeus: 423 (1753); Linnaeus: 193 (1754); Jussieu: 301 (1789); Candolle: 400 (1824); Pax: 84 (1889); Williams: 326 (1898); Pax & Hoffmann: 315 (1934); McNeill: 102 (1962); McNeill: 245 (1963); Chater & Halliday: 116 (1964); Meikle: 261 (1977); Bittrich: 225 (1993).

Annual, biennial or perennial herbs, usually less than 0.3 m tall, often tufted or cushion-like. **Leaves** small, variable in shape, with cauline ones opposite, petiolate or sessile; stipules 0. **Inflorescence** often a panicle or cyme, terminal or rarely axillary, sometimes flowers solitary; bracts herbaceous. **Flowers** bisexual, subperigynous. **Sepals** 5, very rarely 4, free. **Petals** 5, white, cream or pink, entire or emarginate, rarely 0. **Stamens** 5 or 10, arising on a glandular perigynous disc. **Ovary** 1-locular; ovules many on a free-central placenta; styles (2)3(–5), episepalous. **Fruit** a capsule, subglobose, oblong or pyriform, dehiscent, mostly by twice the number of teeth as styles present, by 2 or 3(–5) bifid valves. **Seeds** many, compressed, smooth or tuberculate. $x = 10, 11$ (7, 8, 9, 12, 13) (high polyploidy).

Species ± 150, mainly in northern temperate regions, also in the arctic, some species on the mountains of South America and Northeast Africa; 2 introduced into sthn Afr., infrequent.

Cerastium L. 2430000

Linnaeus: 437 (1753); Linnaeus: 199 (1754); Jussieu: 301 (1789); Candolle: 414 (1824); Sonder: 130 (1860); Pax: 80 (1889); Burtt Davy: 150 (1926); Möschl: 15 (1951); Wild: 346 (1961a); Jalas, Sell & Whitehead: 136 (1964); Henderson & Anderson: 128 (1966); Wild, Hooper & Diniz: 9 (1973); Friedrich: 902 (1979a); Bittrich: 226 (1993).

Annual or perennial herbs, with simple or dichotomously branched stems, usually glandular-hairy. **Leaves** small, opposite, sessile or subsessile, entire; stipules 0. **Inflorescences** terminal, dichotomous, often umbelliform, occasionally flowers solitary; bracts herbaceous or with membranous margins. **Flowers** bisexual, subperigynous. **Sepals** (4)5, free, with scarious-membranous margins. **Petals** (4)5, white, emarginate or bifid, rarely quite entire or deeply cut, sometimes 0. **Disc** of 5 honeyed glands. **Stamens** (8)10 or 5 or fewer. **Ovary** 1-locular; ovules many on free-central placenta; styles (3–)5(6). **Fruit** a cylindrical capsule, often incurved, membranous, dehiscing by twice as many teeth as styles present. **Seeds** many, reniform or subglobose, often tubercled; embryo almost annular. $x = 18$ (12, 13, 17, 19) (high polyploidy).

Species ± 100, with almost cosmopolitan distribution, but mainly in the north temperate regions of the Old World; many weeds; some species are cultivated as ornamentals; 5 in sthn Afr., North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Free State, Lesotho, Western and Eastern Cape.

Corrigiola L. 2469000

Linnaeus: 271 (1753); Linnaeus: 132 (1754); Candolle: 366 (1828); Sonder: 132 (1860); Hooker: 17 (1880); Pax: 90 (1889); Baker & Wright: 12 (1909); Pax & Hoffmann: 298 (1934); Adamson: 396 (1950); Turrill: 13 (1956); Walters: 149 (1964b); Podlech: 1 (1966); Chaudhri: 34 (1968); Wild & Diniz: 3 (1973); Friedrich: 751 (1979b); Bittrich: 225 (1993).

Polygonifolia Adans.: 272 (1763).

Glabrous annual, biennial or perennial herbs with diffusely branched decumbent to prostrate stems, sometimes becoming woody at base. **Leaves** alternate, sessile to subsessile or rarely petiolate, spathulate or linear, glaucous; stipules scarious, auriculate. **Inflorescences** dense, terminal and lateral cymes or small clusters; bracts inconspicuous. **Flowers** bisexual, small, with slightly perigynous receptacles. **Sepals** 5, persistent, green with white scarious margins. **Petals** 5, membranous, white, shorter than or slightly exceeding sepals, oval. **Stamens** 5, with filaments short; anthers often dark brown. **Ovary** 1-locular; ovule solitary, basal on long funicle; style short or almost 0; stigmas 3, subsessile. **Fruit** a crustaceous, indehiscent, trigonous nutlet, enclosed by persistent calyx. **Seeds** globose-ovoid; embryo annular. $x = 9$ (8) (polyploidy).

Species 11; mainly in Europe, Africa and Chile, *Corrigiola litoralis* L. nearly cosmopolitan; the roots are used for medicinal purposes; 2 in sthn Afr., in all provinces and countries.

Dianthus L. 2502000

Linnaeus: 409 (1753); Linnaeus: 191 (1754); Jussieu: 302 (1789); Candolle: 355 (1824); Sonder: 122 (1860); Pax: 76 (1889); Williams: 346 (1893); Burtt Davy: 148 (1926); Pax & Hoffmann: 356 (1934); Hooper: 1 (1959); Tutin: 188 (1964); Podlech: 1 (1967); Wild, Hooper & Diniz: 16 (1973); Meikle: 214 (1977); Bittrich: 232 (1993).

Annual or short-lived perennial herbs or subshrubs, tufted, often somewhat woody towards base; stems mostly thickened at nodes. **Leaves** opposite, grass-like, connate basally and forming a sheath, frequently 5-nerved; stipules 0. **Inflorescences** terminal panicles of cymes, in heads or occasionally flowers solitary, often subtended by bracts. **Flowers** bisexual, rarely unisexual; anthophore often present. **Calyx** gamosepalous, surrounded at base by 2–many bracts, tubular, firm, finely striate, 5-toothed, with many parallel veins, without membranous commissures. **Petals** 5, white, pink or red, rarely yellow, limb entire, toothed or fimbriate, without coronal scales; claw long, with two longitudinal ridges. **Stamens** 10; filaments long, slender. **Ovary** 1-locular, on a short gynophore, with chartaceous cap; ovules many on free central placenta; styles 2, linear, longer than ovary. **Fruit** a capsule, ovoid to cylindric, opening by 4 valves. **Seeds** many, orbicular to ovoid in outline, ± compressed, with facial hilum, black; testa with raised polygonal sculpturing; embryo straight. $x = 15$ (high polyploidy).

Species ± 300, Europe, Asia, especially Mediterranean, Africa; 15 in sthn Afr., widely distributed. Some species are cultivated as ornamentals (e.g. **Dianthus caryophyllus* L. and **D. chinensis* L.).

Drymaria Willd. ex Schult. 2452000

Schultes: 406 (1819); Sonder: 135 (1860); Pax: 86 (1889); Pax & Hoffmann: 306 (1934); Turrill: 9 (1956); Duke: 173 (1961); Wild: 344 (1961a); Wild, Hooper & Diniz: 8 (1973); Bittrich: 220 (1993).

Annual herbs, dichotomously branched and diffuse, sometimes rooting at nodes. **Leaves** opposite or pseudoverticillate, flat, broad or narrow, sessile to long-petiolate; stipules small, mostly setaceous or composed of subulate segments, persistent or fugaceous. **Inflorescences** often terminal or axillary, few- to many-flowered dichasial cymes, or occasionally flowers solitary or clustered in leaf axils. **Flowers** bisexual, subperigynous or hypogynous. **Sepals** 5, free, herbaceous or with margins translucent. **Petals** 5, deeply bifid, white. **Stamens** 2–5; filaments flattened, slightly connate at base; anthers subglobose. **Ovary** superior, slightly stipitate; carpels mostly 3, 1-locular; ovules 2–many, campylotropous on free-central placenta; styles 1-, 2- to 4-fid to ± middle or to base. **Fruit** a capsule, ovoid to spheroid, (2)3-valved. **Seeds** 1–many, reniform-globose or compressed, usually tuberculate; embryo surrounding perisperm. $x = 12$ (polyploidy).

Species ± 48, mostly restricted to the New World from W United States to Patagonia (46), Galapagos Islands (1); *Drymaria cordata* (L.) Willd. ex Roem. & Schult., pantropical, also only species in sthn Afr., Mpumalanga, KwaZulu-Natal and Eastern Cape.

The position of the genus is dubious, even its placement in subfamily Paronychioideae, as it shows some alsinoid characters and the ontogeny of its stipules differs from that of other Paronychioideae.

Herniaria L. 2476000

Linnaeus: 218 (1753); Linnaeus: 103 (1754); Jussieu: 89 (1789); Candolle: 367 (1828); Sonder: 132 (1860); Hookcr: 16 (1880); Pax: 91 (1889); Williams: 556 (1896); Baker & Wright: 12 (1909); Hermann: 206 (1937); Brummitt & Heywood: 151 (1964); Podlech: 2 (1966); Chaudhri: 297 (1968); Friedrich: 755 (1979b); Bittrich: 223 (1993); Gilbert: 98 (1993).

Annual or, mostly perennial, small, compact herbs; stems often prostrate, much branched from base. **Leaves** mostly opposite and unequal, upper ones sometimes alternate (due to reduction of one of the leaves), small, entire, sessile or subsessile, obovate to narrowly elliptic; stipules minute, scarious, entire, sometimes with ciliate margin, 2 per pair of leaves. **Inflorescences** small cymose clusters, usually congested on short lateral branches; bracts and bracteoles small, stipule-like. **Flowers** bisexual or unisexual, ± perigynous, subsessile, small. **Sepals** (4)5(6), mostly plano-concave and connivent to erect. **Petals** (0)4 or 5, minute, subulate-filiform, alternating with sepals. **Stamens** (2)4 or 5, equal or unequal, with or without staminodes, alternating with petals; filaments filiform; anthers oblong or quadrangular and orange-yellow. **Ovary** subglobose or ovoid; ovule solitary, basal, amphitropous; style usually short and occasionally entirely suppressed, sometimes quite distinct and elongate; stigma notched or bifid, subsessile or on a short style. **Fruit** an ovoid to narrowly ellipsoid, membranous nutlet enclosed by persistent calyx, rupturing irregularly at base. **Seeds** globular to lenticular, smooth and shining, dark brown; embryo annular, surrounding endosperm. $x = 9$ (high polyploidy).

Species ± 47, a few widely distributed in Eurasia and North Africa, the rest narrow endemics in Canary Islands, (1 isolated sp. in Somalia); 5 in sthn Afr., mainly in Northern, Western and Eastern Cape, otherwise scattered, except Northern Province, Swaziland and only on borders of KwaZulu-Natal.

*Holosteum L. 2431000

Linnaeus: 88 (1753); Linnaeus: 39 (1754); Jussieu: 299 (1789); Pax: 80 (1889); Pax & Hoffmann: 318 (1934); Walters: 136 (1964a); Friedrich: 870 (1979a); Bittrich: 227 (1993).

Small annual herbs, often viscid-pubescent above, erect, simple or sparsely branched. **Leaves** entire, narrow, lower leaves ± rosulate, the rest opposite, sessile; stipules 0. **Inflorescence** an umbel-like terminal cyme. **Flowers** bisexual, with pedicels deflexed after flowering. **Sepals** 5, free, persistent. **Petals** 5, entire, toothed, or jagged, white. **Stamens** 3–5 or 8–10. **Ovary** cylindrical; ovules many; styles 3(4 or 5). **Fruit** a capsule, ovoid or cylindric, longer than sepals, with twice as many teeth as styles, dehiscent by 6(–10) short recurved teeth. **Seeds** many, asymmetrically reniform and laterally expanded, peltate, tuberculate; embryo horseshoe-shaped. $x = 10$.

Species ± 3, temperate Eurasia, 1 record from Ethiopia; 1 introduced to South and North America and sthn Afr.: **Holosteum umbellatum* L. subsp. *umbellatum*, recorded from near Sutherland in Western Cape.

Krauseola Pax & K.Hoffm. 2453010

Pax & Hoffmann: 308 (1934); Wild: 337 (1961a); Wild, Hooper & Diniz: 2 (1973); Bittrich: 222 (1993).

Pleiosepalum Moss: 65, t. 596 (1931).

Annual or perennial herbs, erect or diffuse, with a sparse indumentum of branched hairs. **Leaves** opposite or apparently whorled, subsessile, obovate to narrowly oblanceolate; stipules deltoid, scarious. **Inflorescences** lax or dense terminal or axillary cymes. **Flowers** bisexual; bracts oblong, with hyaline, ciliolate margins. **Sepals** 9–13, free, spirally arranged, imbricate, green with hyaline margins. **Petals** 5–8, hyaline-membranous, much shorter than sepals. **Stamens** 5–8, alternating with petals. **Ovary** with many ovules; style 1 with 5 stigmatic branches. **Fruit** a capsule, 5-valved, surrounded by persistent sepals. **Seeds** many, reniform, reddish brown; testa minutely reticulate. $x = 8$ (1 report).

Species 2, in tropical East Africa; 1 on sand dunes in Mozambique; 1 in *Acacia—Commiphora* scrub in North Kenya: *Krauseola mosambicina* (Moss) Pax & K.Hoffm., described from Mozambique and recorded in Zululand.

*Moenchia Ehrh. 2432000

Ehrhart: 177 (1788) name conserved; Pax: 81 (1889); Pax & Hoffmann: 322 (1934); Adamson: 393 (1950); Clapham: 145 (1964); Bittrich: 227 (1993).

Glabrous, glaucous, dwarf, erect annual herbs. **Leaves** narrow, sessile, opposite, linear to oblong-lanceolate; stipules 0. **Inflorescences** few-flowered lax cymes, or flowers sometimes solitary; bracts white-margined. **Flowers** bisexual, shortly perigynous, erect. **Sepals** 4(5), free, with broad membranous margins. **Petals** 4(5), entire or retuse, ± half as long as sepals, white. **Stamens** 4(5) or 8(10). **Ovary** ovoid; styles (3)4 or 5. **Fruit** an ovoid capsule, opening by 8 teeth at top. **Seeds** many, reniform, papillose. $x = 9, 19$ (polyploidy).

Species 3, West and Central Europe, Mediterranean; 1 introduced into sthn Afr.: **Moenchia erecta* (L.) Gaertn. & Scherb., Western Cape.

*Paronychia Mill. 2473000

Miller: [1019] (1754); Adanson: 272 (1763); Jussieu: 387 (1815); Willdenow: 517 (1819); Candolle: 370 (1828); Hooker: 15 (1880); Pax: 90 (1889); Baker & Wright: 11 (1909); Adamson: 397 (1950); Chater: 149 (1964c); Henderson & Anderson: 130 (1966); Chaudhri: 64 (1968); Bittrich: 223 (1993); Gilbert: 99 (1993).

Gymnocarpos Forssk.: 65 (1775).

Prostrate, mat-forming annual to perennial herbs, with a taproot. **Leaves** opposite and members of pair often unequal, sessile or subsessile, plane and entire; stipules and bracts ovate-lanceolate, white, often conspicuously silvery and shiny. **Inflorescences** axillary and terminal, ± head-like cymose clusters; flowers usually ± concealed by large, silvery-membranous bracts. **Flowers** bisexual, slightly or distinctly perigynous, small. **Sepals** 5, almost free, hooded and with a dorsal spreading awn near apex. **Petals** 0. **Stamens** 4 or 5; filaments filiform, inserted on perigynous ring; anthers dorsifixed, oblong. **Ovary** ovoid; ovule solitary, basal; styles 2, free or connate below; stigmas 2, elongate or clavate. **Fruit** a nutlet enclosed within persistent calyx, often irregularly rupturing at base; pericarp membranous. **Seeds** many, lenticular to globular, smooth, dark brown; embryo curved. $x = 7, 9$ (8) (high polyploidy).

Species ± 110; nearly cosmopolitan (except sthn Afr., SE Asia); with centres of distribution in the Mediterranean, in Turkey, in the SE United States and Peru/Bolivia; only 7 species penetrating into tropical Africa south to Chad, Ethiopia and Somalia; 1 South American species introduced into sthn Afr.: **Paronychia brasiliana* DC. var. *pubescens* Chaudhri, widespread, a troublesome weed in lawns, especially on golf courses.

*Petrorhagia (Ser.) Link 2497000

Link: 235 (1831); Ball & Heywood: 121 (1964); Friedrich: 978 (1979a); Bittrich: 232 (1993).

Gypsophila L. section *Petrorhagia* Ser.: 354 (1824) in part. *Kohlrauschia* in sense of Levyns: 132 (1966) in part. *Tunica* Mertens & Koch: 182 (1831); Bentham: 145 (1862b); Pax & Hoffmann: 355 (1934); Adamson: 400 (1950).

Erect annual or perennial slender herbs. **Leaves** narrow, grass-like, 1–5-nerved. **Inflorescences** terminal heads. **Flowers** bisexual, with large, membranous bracts, forming an epicalyx. **Calyx** cylindrical to campanulate,

5-toothed, 5–15-nerved, with scarious commissures. **Petals** 5, very shortly bifid, exceeding calyx, pink. **Stamens** 10; anthophore present or almost wanting. **Ovary** 4-locular at base, 1-celled above; styles 2, hairy. **Fruit** a capsule, oblong or ovoid, dehiscent by 4 apical teeth. **Seeds** many, compressed, peltate with a facial hilum; embryo straight. $x = 6, 13$ (aneuploids, polyploidy).

Species 28, Europe, from Mediterranean to Kashmir, and on Canary Islands; 1 introduced into sthn Afr.: **Petrorhagia prolifera* (L.) Ball & Heywood, naturalised in parts of southern Cape region.

Pollichia Aiton 2467000

Aiton: 5 (1789) name conserved; De Candolle: 377 (1828); Sonder: 133 (1860); Hooker: 14 (1880); Pax: 89 (1889); Lüders: 26 (1907); Baker & Wright: 10 (1909); Turrill: 11 (1956); Wild: 358 (1961b); Podlech: 2 (1966); Wild & Diniz: 2 (1973); Bittrich: 224 (1993); Gilbert: 96 (1993).

Scandent, pilose subshrubs, freely branched, with rather stiff branches. **Leaves** clustered at nodes to form false whorls, usually linear, sometimes lanceolate; stipules free, scarious. **Inflorescences** dense, subsessile, axillary cymes, surrounded by white, scarious bracts, and each flower subtended by a bracteole; after anthesis each cyme forms a fleshy (berry-like) infructescence due to swollen bracts and peduncles. **Flowers** bisexual, perigynous, sessile; receptacle cupuliform, as long as sepals. **Sepals** 5, free, small. **Petals** 5, minute, scale-like, white. **Stamens** 1 or 2, inserted on 5-lobed nectary disc. **Ovary** 1-locular; ovules 2, basal, on short funicles; style 1, filiform, persistent. **Fruit** 1-seeded, indehiscent, enclosed by persistent calyx and borne with several other fruits in milky white to reddish brown berry-like infructescence in which rachides and lower parts of bracts are enlarged and fleshy. **Seeds** 1 or 2, ± ovoid; embryo curved. $x = 9$ (1 report, polyploidy).

Monotypic: *Pollichia campestris* Aiton, from northern Arabian Peninsula and Ethiopia, through east tropical Africa to sthn Afr. (all countries and provinces except Western Cape).

Polycarpaea Lam. 2455000

Lamarck: 3, t. 25 ('*Polycarpea*') (1792) name conserved; Candolle: 373 (1828); Sonder: 133 (1860); Pax: 87 (1889); Burtt Davy: 152 (1926); Turrill: 5 (1956); Wild: 341 (1961a); Podlech: 2 (1967); Wild, Hooper & Diniz: 5 (1973); Friedrich: 772 (1979a); Bittrich: 221 (1993).

Annual or perennial herbs, rarely somewhat woody at base, erect, often much-branched, rarely diffuse, tomentum not glandular. **Leaves** opposite or apparently whorled, often clustered at nodes on sessile axillary shoots, linear or oblanceolate to ovate; stipules scarious. **Inflorescences** terminal, loose or compact cymes, bracteate; bracts sepal-like. **Flowers** bisexual; perianth and stamens hypogynous or somewhat perigynous. **Sepals** 5, free, scarious, not keeled, rarely herbaceous, often silvery, white or brown to purple. **Petals** 5, much shorter than sepals, entire, 2-toothed. **Stamens** (2–)5; 5 inner staminodes sometimes present. **Ovary** 1-locular; ovules few to many on a free central placenta; style 3-fid or capitate. **Fruit** a capsule, 3-valved. **Seeds** few to many, often lenticular, sometimes slightly tuberculate, tiny, translucent, brown. $x = 9$ (aneuploids, polyploidy).

Species ± 50, with tropical and subtropical distribution (chiefly palaeotropic); 2 recorded from sthn Afr., Namibia, Botswana, the northern provinces to Swaziland and KwaZulu-Natal; **Polycarpaea spirostylis* F.Muell. from Australia is a copper indicator.

Polycarpon L. 2453000

Linnaeus: 881 (1759); Jussieu: 299 (1789); Kunth: 40 (1823); Candolle: 376 (1828); Sonder: 133 (1860); Pax: 86 (1889); Burtt Davy: 152 (1926); Adamson: 396 (1950);Wild: 339 (1961a); Chatcr: 153 (1964d); Henderson & Anderson: 132 (1966); Podlech: 3 (1967); Wild, Hooper & Diniz: 3 (1973); Meikle: 277 (1977); Bittrich: 221 (1993).

Annual, biennial or perennial herbs, glabrous, diffusely or dichotomously branched; stems usually scabridulous. **Leaves** opposite or in whorls of 4, obovate to suborbicular, flat, sometimes fleshy, ± petiolate; stipules silvery-membranous, scarious. **Inflorescences** crowded, terminal or axillary, many-flowered cymes with scarious bracts. **Flowers** bisexual, subperigynous, small. **Sepals** 5, free, keeled or winged with scarious margin. **Petals** 5, small, entire, hyaline, shorter than sepals. **Stamens** 5, arising on a perigynous disc, episepalous; filaments shortly connate at base. **Ovary** 1-locular; ovules many on a free-central placenta; style connate below, 3-fid above. **Fruit** a capsule, dehiscent almost to base into 3 spirally twisting valves. **Seeds** many, ovoid or lenticular, sometimes postulate; embryo curved or nearly straight. $x = 7, 8, 9$ (high polyploidy).

Species ± 16, in Europe and the Mediterranean, 2 in S America; 2 in sthn Afr.: *Polycarpon prostratum* (Forssk.) Aschers. & Schweinf. and *P. tetraphyllum* (L.) L. cosmopolitan in warm and temperate situations, scattered in Namibia, Botswana, Mpumalanga, Free State, KwaZulu-Natal, Northern, Western and Eastern Cape.

**Sagina* L. 2433000

Linnaeus: 128 (1753); Linnaeus: 62 (1754); Jussieu: 300 (1789); Candolle: 389 (1824); Pax: 81 (1889); Burtt Davy: 151 (1926); Pax & Hoffmann: 326 (1934); Adamson: 393 (1950); Clapham & Jardine: 146 (1964); Zohary: 121 (1966); Meikle: 273 (1977); Friedrich: 827 (1979a); Chorney: 227 (1986); Danin: 413 (1990); Bittrich: 228 (1993).

Dwarf annual or perennial herbs, often tufted, sometimes cushion-like, or procumbent. **Leaves** subulate to linear-lanceolate, connate at base into a membranous sheath; stipules 0. **Inflorescences** few-flowered axillary or terminal cymes or flowers solitary on slender pedicels. **Flowers** bisexual, small and relatively inconspicuous. **Sepals** 4 or 5(6), free, sometimes persistent, green. **Petals** usually 0 or minute. **Stamens** 4 or 5 or (8)10. **Ovary** 1-locular; ovules many on free-central placenta; styles 4 or 5, very short, alternating with sepals. **Fruit** a capsule, dehiscent to base into 4 or 5 valves. **Seeds** many, orbicular-reniform, minute, brownish, slightly granulated. $x = 11$ (6, 7, 8, 9, 10) (high polyploidy).

Species ± 30, northern temperate regions, arctic, mountains from South to East Africa, Himalayas, New Guinea, Andes, several species (Pearlworts) widespread as tiny weeds in lawn; 2 introduced into sthn Afr.: **Sagina apetala* Ard. and **S. maritima* G. Don, scattered in Western Cape and KwaZulu-Natal.

**Scleranthus* L. 2483000

Linnaeus: 406 (1753); Linnaeus: 190 (1754); Brown: 412 (1810); Candolle: 378 (1828); Hooker: 19 (1880); Pax: 92 (1889); Baker & Wright: 13 (1909); Pax & Hoffmann: 336 (1934); Adamson: 394 (1950); Sell: 148 (1964); Henderson & Anderson: 136 (1966); Meikle: 285 (1977); Friedrich: 941 (1979a); Bittrich: 229 (1993).

Erect or decumbent annual herbs, low, rigid, much, dichotomously branched; stems angled, with a single line of reversed hairs. **Leaves** opposite, subulate, pungent, expanding into membranous, connate bases; stipules 0. **Inflorescences** axillary or terminal, few-flowered cymes or flowers solitary; bracts leaf-like. **Flowers** bisexual, perigynous, sessile, very small, green. **Calyx**: tube campanulate, herbaceous when young, becoming crustaceous with age; lobes 5. **Petals** 0. **Stamens** 5, arising in throat of calyx tube; filaments subulate. **Ovary** ovoid, 1-locular; ovule 1(2), pendulous from a basal funicle; styles 2, free, filiform, erect. **Fruit** a nutlet enclosed by enlarged and indurated wall of perigynous zone and persistent, hardened calyx tube and crowned by persistent calyx lobes. **Seed** 1, subglobose to horseshoe-shaped, smooth; embryo curved, peripheral; endosperm abundant. $x = 11$ (12) (polyploidy).

Species ± 10, temperate Eurasia, Mediterranean, Ethiopia, Australasia, 1 naturalised species in sthn Afr.: **Scleranthus annuus* L., introduced from Europe, before the end of 19th century, KwaZulu-Natal, Northern, Western and Eastern Cape. It is a troublesome weed in wheat and lucerne lands and has been suspected of causing poisoning in sheep.

Silene L. 2490000

Linnaeus: 416 (1753); Linnaeus: 193 (1754); Jussicu: 302 (1789); Sonder: 125 (1860); Pax: 70 (1889); Burtt Davy: 149 (1926); Pax & Hoffmann: 343 (1934); Wild: 350 (1961a); Chater: 158 (1964); Henderson & Anderson: 138 (1966); Podlech: 4 (1967); Bittrich: 233 (1993).

Melandrium Mertens & Koch: 274 (1812); Adamson: 399 (1950).

Annual, biennial or perennial herbs, rarely geophytes or shrublets, sometimes caespitose; plants often monoecious or rarely gynodioecious or dioecious. **Leaves** opposite, entire, sometimes slightly connate at base; stipules 0. **Inflorescences** dichasial or monochasial, sometimes ± capitate, sometimes flowers solitary. **Flowers** bisexual or unisexual; anthophore present. **Calyx**: tube 10–30(–60)-nerved, sometimes strongly inflated, with 5 short lobes, often glandular. **Petals** 5, arising on margin of disc, with long claw and entire to deeply divided limb, often with 2 scales at base. **Stamens** 10, in male and bisexual flowers, sometimes abnormally reduced, arising on margin of disc, the 5 opposite petals sometimes attached to claw. **Disc** columnar, often pubescent. **Ovary** on long gynophore adnate to disc, usually 1-locular, sometimes 3-locular towards base; ovules many on free central placenta; styles (2–)5, usually 3, as long as or longer than ovary, often glandular. **Fruit** a capsule, opening usually by twice as many teeth as styles present. **Seeds** many, ± reniform, compressed, reticulate or tuberculate, sometimes with 2 wings; embryo ± annular. $x = 12$ (aneuploids, high polyploidy).

Species ± 700, in Eurasia (± 600 species), Africa (± 92 species), North America (± 50 species); ± 19 in sthn Afr., of which 3 are naturalised, widespread in all provinces and countries except Botswana.

*Spergula L. 2449000

Linnaeus: 440 (1753); Linnaeus: 199 (1754); Sonder: 135 (1860); Pax: 85 (1889); Burtt Davy: 151 (1926); Adamson: 394 (1950); Turrill: 11 (1956); Wild: 346 (1961a); Ratter: 154 (1964); Henderson & Anderson: 140 (1966); Podlech: 4 (1967); Friedrich: 775 (1979a); Bittrich: 220 (1993).

Annual, erect to suberect herbs, often glandular-viscid; with forked or fascicled branches. **Leaves** pseudoverticillate, linear to filiform, with abbreviated leaf buds in their axils and appearing whorled; stipules small, scarious, caducous, 4 per leaf pair. **Inflorescences** loose terminal dichasia; pedicels reflexed after flowering, erect in ripe fruit. **Flowers** bisexual, subperigynous. **Sepals** 5, free, herbaceous and often ± fleshy, with scarious margins. **Petals** 5, entire, white. **Stamens** 10, arising on a perigynous ring. **Ovary** 1-locular; ovules many; styles (3–)5, alternating with sepals. **Fruit** a capsule, ± globose, opening by 5 valves or teeth not separating completely. **Seeds** many, grey-black, compressed, biconvex, very narrowly winged; embryo annular. $x = 9$ (polyploidy).

Species 6; 5 in temperate Eurasia, chiefly in Europe and the Mediterranean; 1 in sthn Afr.: **Spergula arvensis* L., a cosmopolitan weed of waste places and cultivated lands, North-West, Gauteng, Mpumalanga, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

Spergularia (Pers.) J.Presl & C.Presl 2450000

Presl & Presl: 94 (1819); Pax & Hoffmann: 312 (1934); Monnier & Ratter: 154 (1964); Adamson: 394 (1950); Meikle: 274 (1977); Friedrich: 782 (1979a); Bittrich: 220 (1993).

Arenaria section *Spergularia* Pers.: 504 (1805). *Lepigonum* Sond.: 134 (1860).

Annual, biennial or perennial herbs, sometimes woody at base, diffuse, often glandular-viscid; stems often decumbent or ascending, swollen at nodes, with forked or fascicled branches. **Leaves** opposite, sometimes ± fleshy, linear to filiform, with abbreviated leaf buds in their axils and appearing whorled; stipules scarious, connate in pairs and sheathing the node. **Inflorescences** cymose or pseudo-racemose. **Flowers** bisexual, rarely unisexual, subperigynous. **Sepals** 5, free, divided almost to base, obscurely nerved, with scarious margins. **Petals** 5, entire, rarely 0, white, pink or red. **Stamens** (2)5–10, unequal, arising on a perigynous ring; anthers medifixed, introrse. **Ovary** 1-locular; ovules many on free-central placenta; styles 3(–5), free or ± connate. **Fruit** a capsule, subglobose or ovoid-trigonous, dehiscent almost to base into 3(–5) valves or teeth. **Seeds** many, ovoid, pyriform or subtrigonous, often winged; testa smooth, rugose or variously tuberculate; embryo annular or hooked. $x = 9$ (aneuploids, high polyploidy).

Species ± 25, cosmopolitan, especially some halophytes with nearly worldwide distribution; 4 in sthn Afr., mainly in Cape region, but also scattered in Namibia, North-West, Free State and KwaZulu-Natal.

*Stellaria L. 2429000

Linnaeus: 421 (1753); Linnaeus: 193 (1754); Jussieu: 301 (1789); Sonder: 130 (1860); Pax: 79 (1889); Burtt Davy: 51 (1926); Pax & Hoffmann: 320 (1934); Turrill: 24 (1956); Wild: 349 (1961a); Chater & Heywood: 133 (1964); Henderson & Anderson: 142 (1966); Wild, Hooper & Diniz: 11 (1973); Friedrich: 883 (1979a); Bittrich: 227 (1993).

Slender annual or perennial herbs, often with fragile, sprawling stems, usually freely branched, sometimes rooting from nodes. **Leaves** opposite, sessile or petiolate, flat or very rarely subulate; stipules 0. **Inflorescences** axillary, lax dichasial cymes, rarely flowers solitary; bracts membranous or herbaceous. **Flowers** bisexual or rarely gynodioecious, hypogynous or subperigynous, small, honeyed. **Sepals** 5, rarely 4, free, with scarious margins, persistent. **Petals** (0)4–5, usually very deeply bifid, rarely 5–10-cleft, white. **Stamens** (3–)5(–10), ± perigynous, arising and dehiscing in 2 sets. **Disc** annular, elongating or of 5 interstaminal glands. **Ovary** 1-locular; ovules many on free-central placenta; styles (2)3(4 or 5), episepalous. **Fruit** a capsule, spherical or oblong, short, dehiscent by 6, rarely 4, 8 or 10 valves. **Seeds** many, rarely few or one, compressed, granulate, roundish-reniform; embryo annular. $x = 13$ (9, 10, 11, 12) (aneuploids, high polyploidy).

Species 150–200, mainly in Eurasia, with a centre of distribution in the mountains of East Central Asia, some species in afromontane Africa, some species with cosmopolitan distribution; 3 introduced into sthn Afr., widespread weeds of cultivation, Namibia, Botswana, Northern Province, North-West, Gauteng, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

*Vaccaria Wolf 2501000

Wolf: iii (1776); Wolf: 234 (1781); Medikus: 96 (1789); Pax: 76 (1889); Burtt Davy: 149 (1926); Chater: 186 (1964b); Rauschert: 494 (1965); Henderson & Anderson: 134 (1966); Rauschert: 52 (1966); Zohary: 104 (1966); Friedrich: 977 (1979a); Léonard: 297 (1985); Rechinger: 337 (1988); Bittrich: 231 (1993).

Erect, glabrous annual herbs, dichotomously branched. **Leaves** opposite, ovate or lanceolate, glaucous, clasping at base; stipules 0. **Inflorescences** lax terminal dichasia. **Flowers** bisexual; antherophore present. **Calyx**: tube inflated below, whitish, prominently 5-ribbed, accrescent and becoming 5-winged in fruit, without scarious commissures; epicalyx 0. **Petals** 5, clawed; limb notched, exserted from calyx, pink or purple; coronal scales 0. **Stamens** 10, those opposite petals attached to claw; filaments slender. **Ovary** 2-locular below, 1-locular above; ovules many on free-central placenta; styles 2, linear, several times as long as ovary, glandular. **Fruit** a

capsule, oblong to globular, membranous, enclosed in persistent calyx tube, with papery exocarp, dehiscent by 4 teeth, endocarp membranous, dehiscing irregularly. **Seeds** many, reniform or subglobose, minutely tuberculate, black. $x = 10$ (aneuploids, polyploidy).

Species 1 or 4, central and eastern Europe, Mediterranean, temperate Asia; 1 introduced into sthn Afr.: **Vaccaria hispanica* (Mill.) Rausch. var. *hispanica*, North-West, Gauteng, Mpumalanga, Free State, Western and Eastern Cape.

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*Casuarinaceae

(Hamamelidae—Casuarinales)

Compiled by M. Jordaan

Trees, dioecious or rarely monoecious, with persistent, at length bark-covered, woody branches from which arise numerous, very slender, ± straight, drooping, little-branched, green and usually flexible, deciduous, *Equisetum*-like, articulate branchlets, with several short basal articles and 1–many longer, distal articles; articles with as many 4–20 longitudinal ridges. **Leaves** on branches and on branchlets reduced to small, dark, triangular scales or teeth connate at base, in a whorl of 4–20 at apex of each article (1 per longitudinal ridge); on persistent branches leaves becoming separate as stem thickens; leaf whorls, and therefore also ribs, alternating at consecutive nodes; stipules 0. **Flowers** unisexual, wind-pollinated, very small and much reduced, sessile, solitary in axil of a bract and enclosed by 2 membranous lateral bracteoles, grouped into unisexual inflorescences with closely spaced alternating whorls of bracts similar to scale leaves. **Male inflorescences** short to elongated catkin-like spikes, terminating deciduous branches. **Male flowers** with a single stamen, enclosed in bud by 1 or 2 (anterior and posterior) concave or hood-shaped membranous perianth segments which break off at base as stamen develops; mature anther exserted, 2-thecous, basifixed. **Female inflorescences** shortly stalked or subsessile, ovoid or globular heads, axillary along persistent branches. **Female flower**: perianth 0; carpels 2, fused in ovary and in proximal part of style; placentation axile; ovules 2; style 2-branched, reddish, short, with 2 long, filiform, well-exserted stigmas. **Infructescences** cone-like, globular, ovoid or cylindrical, ± woody, formed by enlargement and thickening of accrescent bracts and bracteoles of individual flowers, bracteoles usually more elongated and forming pairs of valves enclosing the true fruit and opening when ripe. **Fruit** a small samara, very much laterally compressed, apex produced into large, ± translucent wing with 1 longitudinal nerve excurrent at apex. **Seed** solitary; endosperm 0; embryo straight, often more than one. $x = 9, 11$ (8, 10, 12, 13, 14).

Genera 4, species 70, native to Malaysia, Australia and Polynesia; with one widespread littoral species: **Casuarina equisetifolia* L. extending to Madagascar and the east coast of tropical Africa, occurring mainly in dry, infertile and saline areas; widely grown for timber and fuel wood in many parts of the tropics; naturalised in sthn Afr.

Brown: 571 (1814) as Casuarineae; Miquel: 332 (1868); Bentham: 401 (1880); Engler: 16 (1888) as Casuarinaceae; Johnson & Wilson: 237 (1993).

*Casuarina L. 1855000

Linnaeus: 143 (1759); Adanson: 481, 543 (1763); Forster & Forster: 103, t. 52 (1776); Jussieu: 412 (1789); Miquel: 332 (1868); Engler: 16 (1888) as Casuarinaceae; Friis: 499 (1980); Wilmot-Dear: 1 (1985); Wilmot-Dear & Gilbert: 262 (1989); Wilson & Johnson: 100 (1989); Wilmot-Dear: 116 (1991); Johnson & Wilson: 237 (1993).

Description as for family.

Species 17, tropical to warm-temperate habitats, almost throughout the range of the family except for Tasmania and parts of western and central Australia; 2 in sthn Afr. have become partially naturalised in KwaZulu-Natal and Eastern Cape; originally planted for stabilising coastal sands.

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Celastraceae

(Rosidae—Celastrales)

Compiled by R.H. Archer & M. Jordaan

Trees, shrubs or woody climbers, without tendrils, or rarely ericoid shrubs (*Empleuridium*), sometimes polygamous to dioecious, glabrous or with simple hairs, unarmed or with spines (modified axillary shoots), sometimes with latex in leaves and bark, evident as elastic threads (trans-1, 4-polyisoprene) on pulling parts apart; branches often angular or 4-lined, often with yellow powdery pigments present on exposed bark. **Leaves** opposite, subopposite, alternate or spiral, sometimes fasciculate on short shoots (brachyblasts), simple, often leathery, entire or with crenate or denticulate to spinose margins; stipules small, mostly caducous, usually adjoining ridges on stem. **Inflorescences** axillary or terminal dichasial or monochasial cymes, panicles or thyrses, sometimes with accessory branches, fasciculate or solitary, usually bracteate; pedicels often articulate. **Flowers** bisexual or unisexual, regular, usually small. **Sepals** 3–5(6), imbricate or rarely valvate in bud, free or connate at base, usually persistent. **Petals** 3–5(6), usually free, usually longer than sepals, sometimes with ventral grooves or hollows, usually persistent. **Disc** fleshy, variously shaped, often saucer-shaped, 4- or 5-lobed or entire. **Stamens** (2)3–5, arising under or on margin of disc; filaments often broadened at base; free or connate to base of disc; anthers (1)2-thecous, extrorse or introrse, basi- or dorsifixed or versatile, opening by longitudinal slits; staminodes present in female flowers, shorter than stamens in male flowers. **Ovary** 2–5-locular, or rarely 1-locular by abortion, superior or half-inferior (*Empleuridium*), partly or almost completely immersed in disc (*Pseudosalacia*), sessile or on short androgynophore, with 2(3–12) erect or rarely pendulous ovules per locule; style usually thick, sometimes almost obsolete; stigma 2–5-lobed, rarely lobes bifid, absent in male flowers. **Fruit** capsular, loculicidally dehiscent, or with divergent, dorsally flattened, dehiscent mericarps, or follicle-like, or baccate or nut-like, or drupaceous or dry, indehiscent and winged. **Seeds** with or without a fleshy or submembranous, coloured aril, or winged with funicle free from wing or united to its base or neither (usually in indehiscent fruit); with or without endosperm; embryo erect, with cotyledons flat or fleshy.

Genera 60–70; species 1000, tropical and warmer temperate regions; sthn Afr.: genera 19, species ± 80.

Adamson: 564 (1950); Robson: 355 (1966); Robson *et al.*: 1 (1994); Jordaan: 1 (1995); Archer: 1 (1996); Archer & Van Wyk: 459 (1996a); Archer & Van Wyk: 146 (1997); Jordaan & Van Wyk: 299 (1998a); Jordaan & Van Wyk: 322 (1998b); Jordaan & Van Wyk: 177 (1999).

Key to genera

1a Fruit capsular or follicle-like, dehiscent when dry and mature; seeds arillate or without aril:
2a Plants with spines; leaves fasciculate on brachyblasts, at least on older branches:
3a Suffrutices, shrubs or small trees; flowers nearly always functionally unisexual with staminodes in female, and pistillodes in male flowers; ovules 2(3) per locule; ovary (2)3(4)-locular; seeds completely or incompletely enveloped by a well or weakly developed aril, or aril only a basal rim ..... **Gymnosporia**
3b Shrubs or woody climbers; flowers always bisexual; ovules 3–12 per locule; ovary always 3-locular; seeds completely enveloped by a well-developed aril:
4a Small shrubs; spines always leafy and floriferous, with more than one node per spine; leaves with venation obsolete, margin entire; disc cream, brown-spotted; ovules usually fewer than 6 per locule; aril pink ..... **Gloveria**
4b Shrubs or woody climbers; spines occasionally leafy and floriferous, when leafy not more than one node per spine; leaves with venation conspicuous, margin with few teeth in distal half, occasionally subentire; disc green; ovules usually 6 or more per locule; aril orange ..... **Putterlickia**
2b Plants without spines; leaves alternate or opposite, never fasciculate:
5a Ericoid shrublets; leaves scattered, needle-like; capsule follicle-like, dehiscing entirely along one suture ..... **Empleuridium**
5b Trees, shrubs or lianes; leaves not needle-like; capsule dehiscing entirely along 2 or 3 sutures:
6a Leaves alternate; seeds ellipsoid, with or without membranous aril:
7a Capsules with wing-like emergences ..... **Pterocelastrus**
7b Capsules smooth or verruculose, without wing-like emergences:
8a Leaves large, usually > 70 mm long; ovary almost completely immersed in disc; seeds exarillate ..... **Pseudosalacia**
8b Leaves small, usually < 70 mm long; ovary almost free or up to half immersed in disc; seeds covered by a thin membranous aril ..... **Maytenus**
6b Leaves opposite, at least on flowering shoots; seeds flattened or irregularly shaped, with wings, aril reduced or absent:
9a Capsule expanded laterally, forming 3 dehiscent mericarps, each dehiscing by median suture into 2 caducous valves; seeds with or without wings; stamens (2)3(4), inside disc or disc absent ..... **Hippocratea**
9b Capsule elongated, narrow, dehiscing loculicidally in 3 valves; seeds winged, aril reduced or absent; stamens 5, outside disc:
10a Seeds with wings; leaves narrowly elliptic to elliptic, very rarely widely ovate ..... **Catha**
10b Seeds without wings, aril reduced or absent; leaves widely elliptic to ovate ..... **Lydenburgia**
1b Fruit indehiscent; seeds without an aril:
11a Fruit drupaceous; leaves alternate, opposite or fasciculate:
12a Endocarp thick and woody (stone); leaves usually opposite or fasciculate, glabrous; sepals ± subcircular with margin entire ..... **Elaeodendron**
12b Endocarp thin and crustaceous; leaves alternate, pubescent or glabrous; sepals ± deltoid with laciniate margin:
13a Latex threads evident in leaves and bark on pulling parts apart; fruit white or yellow ..... **Robsonodendron**
13b Latex threads absent; fruit red or reddish ..... **Mystroxylon**

11b Fruit baccate or small and nut-like; leaves opposite or subopposite, rarely alternate:
14a Fruit small, nut-like and asymmetrical with persistent lateral style or stylar scar; ovules 2–4 per locule ..... **Pleurostylia**
14b Fruit baccate:
15a Fruit often large and globose, 1–20-seeded; seeds (pyrenes?) irregular, large; ovary with 2–8 ovules per locule.... ..... **Salacia**
15b Fruit usually smaller, globose or ellipsoid, 1–3(–6)-seeded; ovary with 2 ovules per locule:
16a Ovules pendulous; sepals vestigial; leaves coriaceous with margin revolute ..... **Maurocenia**
16b Ovules erect; sepals normal; leaves variously textured with margin plane or occasionally revolute:
17a Shrubs or trees; inflorescence a compound dichasium; flowers pedicellate; ovary 2- or 3-locular; ripe fruit light to dark brown or purplish, succulent or ± fleshy ..... **Cassine**
17b Lianes, scrambling shrubs or small trees; inflorescence a compact dichasium or thyrsoid; flowers sessile; ovary 2-locular; ripe fruit red or purple, fleshy or leathery:
18a Lianes or scrambling shrubs; leaves opposite to alternate; inflorescence a compact dichasium; flowers 5-merous; sepals triangular, coriaceous; berries elliptic..... **Allocassine**
18b Lianes, scrambling shrubs or small trees; leaves opposite; inflorescence thyrsoid with simple or compound cymules arranged along the axis; flowers 4- or 5-merous; sepals ± suborbicular, fleshy; berries spheroid ..... **Lauridia**

Allocassine N.Robson 4641030

Robson: 30 (1965); Codd: 124 (1966); Robson: 379 (1966); Archer & Van Wyk: 189 (1998b).

Slender scrambling shrubs or lianas, unarmed, glabrous; bark greyish or light brown, periderm persistent with no sequential periderm formation observed, phellem, 1–1.5 mm thick, with conspicuous orange pigment in slash, surface ± smooth. **Branchlets** terete or flattened, greyish brown. **Leaves** usually opposite or alternate on young shoots, occasionally bracteose on climbing shoots; lamina elliptic to broadly elliptic to oblong, very large, bluish green, glossy on both surfaces, base rounded to cuneate, apex rounded to retuse, rarely acute, margin entire or remotely glandular-crenulate, rigidly coriaceous; venation conspicuous on both surfaces, fine reticulation sometimes more conspicuous above, indistinctly brochidodromus; petiolate; stipules minute, ± triangular, brownish black, caducous. **Inflorescences** pedunculate, compact dichasial with flowers sessile, axillary, 1–10 per inflorescence; bracts minute, bracteoles occasionally present. **Flowers** bisexual. **Sepals** 5, greenish with reddish cilia, ovate, thick, coriaceous, margin ciliolate. **Petals** 5, yellow-green, narrowly obovate, erect, sessile, apex rounded, margin entire. **Disc** fleshy, entire. **Stamens** 5, erect; filaments relatively long, flattened, arising from and united at base with margin of disc; anthers basifixed, introrse. **Ovary** ± immersed in and adnate to disc, 2-locular, with 2 erect collateral ovules per locule; stigma inconspicuously lobed. **Fruit** baccate, red, ellipsoid, up to 32 × 20 mm, mesocarp fleshy. **Seeds** black, narrowly ellipsoid; fleshy endosperm present; embryo erect, with cotyledons fleshy, narrowly elliptic.

Monotypic: *Allocassine laurifolia* (Harv.) N.Robson, occurring in dry forest and forested ravines in the eastern parts of Zimbabwe, southern parts of Mozambique; in sthn Afr. in Swaziland, KwaZulu-Natal and Eastern Cape.

Cassine L. 4641000

Linnaeus: 129 (1754); Candolle: 11 (1825) in part; Sonder: 465 (1860b); Davison: 326 (1927); Loesener: 176 (1942); Codd: 123 (1966); Archer & Van Wyk: 146 (1997b).

Hartogia Thunb. ex L.f.: 16 (1782); Candolle: 12 (1825); Sonder: 464 (1860b); Hooker: 363 (1862); Davison: 345 (1927); Loesener: 179 (1942). *Hartogiella* Codd: 219 (1983).

Slender to tall evergreen trees, shrubs or suffrutices, unarmed, glabrous; bark with yellow pigment usually present or hardly discernible. **Branchlets** 4-lined to subangular. **Leaves** opposite or rarely subopposite; stipules minute, triangular, brownish black, marcescent. **Inflorescences** pedunculate or sessile, axillary, dichasial. **Flowers** usually bisexual, pedicellate. **Sepals** 4 or 5, equal, ovate or deltoid to suborbicular, margin ciliolate or laciniate. **Petals** 4 or 5, cream to white, elliptic to oblong, spreading, margin entire. **Disc** fleshy, lobed or entire. **Stamens** 4 or 5, ± spreading or erect, arising from and united at base with margin of sinuses in disc. **Ovary** ± immersed and adnate to disc, 2- or 3-locular, with 2 erect collateral ovules per locule; style short or absent; stigma usually conspicuously 2- or 3-lobed. **Fruit** baccate, spheroid, ± 10 mm in diam., brown to dark brown or purplish; mesocarp fleshy or leathery. **Seeds** 1 or 2(–6), spheroid to ellipsoid, seed-coat brown; fleshy endosperm present; embryo erect with cotyledons fleshy, widely elliptic to circular.

Species 3, endemic to sthn Afr., especially Western Cape; forest and woodland in Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape. Most nonsouthern African species previously referred to as *Cassine* are best classified in *Elaeodendron*.

Catha Forssk. ex Scop. 4629000

Scopoli: 228 (1777); Oliver: 364 (1868); Davison: 339 (1927); Robson: 379 (1966); Friis: 661 (1984); Robson *et al.*: 25 (1994).

Slender trees, unarmed, glabrous or with conspicuous hairs in axils of stipules; powdery yellow pigments in bark. **Leaves** opposite on flowering shoots, alternate on vegetative ones, lanceolate, coriaceous, margin repand-serrate, petiolate; stipules triangular-acicular, free or ± united interpetiolarly, rapidly caducous. **Inflorescence** a many-flowered, dense, pedunculate, axillary dichasium; bracts persistent. **Flowers** bisexual, pedicellate; pedicels articulated at base. **Sepals** 5, small, ovate, imbricate, connate at base, deeply laciniate. **Petals** 5, much longer than sepals, oblong to elliptic, imbricate in bud, spreading, white or greenish. **Disc** saucer-shaped, with 5-crenate margin. **Stamens** 5, erect or soon becoming recurved, shorter than petals; filaments subterete; anthers basifixed. **Ovary** 3-locular, with 2 erect collateral ovules per locule; styles 3, free; stigmas 3. **Fruit** capsular, oblong, ± trigonous, dehiscing loculicidally into 3 valves; valves usually with prominent septal ridges on inner surface. **Seeds** 1–4, reddish, oblong, rugose-papillose, with a wing below point of attachment; endosperm present.

Monotypic: *Catha edulis* (Vahl) Endl. or Kat, widespread in eastern tropical Africa, Madagascar and the Arabian Peninsula; in sthn Afr., Northern Province, Mpumalanga, KwaZulu-Natal, Western and Eastern Cape. The leaves are chewed for an amphetamin-like stimulant action.

Elaeodendron Jacq. 4640000

Jacquin: t. 48 (1782) & 5 (1787); Robson: 385 (1966); Robson *et al.*: 29 (1994); Archer & Van Wyk: 41 (1996b); Archer & Van Wyk: 93 (1998c).

Cassine L. in part, Davison: 326 (1927). *Crocoxylon* Eckl. & Zeyh.: 128 (1834/1835); Robson: 40 (1965); Robson: 390 (1966). *Pseudocassine* Bredell: 330 (1937); Compton: 338 (1976).

Shrubs to tall evergreen trees, unarmed, glabrous; bark with layers of yellow pigment occasionally present or hardly discernible. **Branchlets** subangular to terete; lenticels usually prominent. **Leaves** opposite to subopposite, occasionally alternate, spiralled to fasciculate; stipules minute, ± triangular, marcescent. **Inflorescences** usually pedunculate, dichasial. **Flowers** usually bisexual or occasionally unisexual, sometimes with petaloid staminodes in female flowers; pedicellate. **Sepals** 3–5, equal, subcircular. **Petals** 3–5, cream to greenish, oblong to ovate, entire or with ventral projections, spreading. **Disc** entire to subentire and convex, fleshy, or flat and quadrangular, with sinuses at points where stamens arise, flat to concave. **Stamens** 3–5, erect to spreading; arising inside margin of disc or from sinuses in margin of disc. **Ovary** ± half immersed in and adnate to disc, 2–4-locular, with 2 erect, collateral ovules per locule; style short to astylous; stigma inconspicuous. **Fruit** drupaceous, spheroid to ellipsoid, white to yellow; stone narrowly elliptic to elliptic, surface smooth or with grooves. **Seeds** brownish, narrowly ellipsoid, ovoid, flattened to triangular, postchalazal vascular bundles often present; endosperm present; embryo erect with cotyledons fleshy, elliptic or ovate. $x = 17$.

Species ± 30, cosmopolitan; 8 widespread in Africa; 4 in sthn Afr. mainly in forest or woodland: Namibia, Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Empleuridium Sond. 4626010

Sonder in Harvey: 49 (1859); Sonder: 442 (1860a) assigned to Rutaceae; Goldblatt *et al.*: 167 (1985).

Ericoid, erect, unarmed, short-lived shrubs, glabrous. **Leaves** scattered, simple, needle-like; stipules small, scale-like. **Flowers** axillary, solitary, small, pedicellate. **Calyx** 4-partite, with ovate, acute segments. **Petals** 4, ovate, acute, spreading, whitish. **Disc** 4-lobed. **Stamens** 4, arising on margin of disc, opposite calyx segments; anthers introrse. **Ovary** half-inferior, elongate after anthesis, 1-locular, with 4 erect, basal ovules; style short, persistent; stigma capitate. **Fruit** relatively large, fusiform, follicle-like, 1-seeded, dehiscing entirely along one suture. **Seeds** black, large, with a large, white, basal aril (elaiosome).

Monotypic: *Empleuridium juniperinum* Sond. & Harv., mountains in the Caledon District (Western Cape).

Gloveria M.Jordaan 4628010

Jordaan & Van Wyk: 299 (1998a).

Evergreen, intricately branched, bluish grey, robust shrubs; branchlets arching downwards, spinescent, glabrous. **Spines** robust, always floriferous and leafy, 2–4(5) nodes with leaves or leaf scars per spine. **Branches** terete, young branchlets reddish brown, becoming grey, rigid, flexuous; bark splitting longitudinally, lenticels sunken. **Leaves** fasciculate, in axils of spines or more often on brachyblasts on spines, coriaceous, grey, glabrous, entire; petiole ± absent; stipules minute, subulate. **Inflorescence** a dichasium, borne on abbreviated branches. **Flowers** bisexual, hypogynous. **Sepals** 5, suborbicular, margin ciliate. **Petals** 5, ovate-oblong, fleshy, margin subentire, incurved, with distinct venation on ventral face, pink to red outside, cream inside. **Disc** fleshy, flat, faintly 5-lobed, margin slightly undulate, creamy white, brown-spotted. **Stamens** 5, shorter than petals; anthers oblong. **Ovary** 3-locular; ovules 3–6 per locule; style terete; stigma faintly 3-lobed. **Fruit** a capsule, red, obconic-trigonous, smooth, chartaceous. **Seeds** dark brown, almost completely enveloped by a pinkish aril.

Monotypic: *Gloveria integrifolia* (L.f.) M.Jordaan, confined to Northern and Western Cape.

Gymnosporia (Wight & Arn.) Hook.f. 4627000

Hooker: 365 (1862) emend. Loesener (1942) name conserved; Davison: 290 (1927) in part; Marais: 381 (1960) in part; Robson: 358 (1966) in part; Sebsebe Demisew: 45 (1985) in part; Robson *et al.*: 3 (1994) in part; Jordaan & Van Wyk: 177 (1999).

Celastrus sect. *Gymnosporia* Wight & Arnott: 159 (1834).

Small trees, shrubs or rhizomatous suffrutices, spinescent, usually with long shoots and weakly or well-developed brachyblasts. **Spines** slender to very robust, straight, axillary or terminating brachyblasts, occasionally leafy and/or floriferous. **Branches** terete, angular to striate-angular, often drooping; bark smooth or flaking, lenticels occasionally present. **Leaves** alternate or fasciculate on brachyblasts, glabrous or puberulous, entire or with irregular to regular teeth, subsessile or shortly petiolate; stipules free, subulate, marcescent. **Inflorescence** a subdichasium or dichasium, few- to many-flowered, fasciculate in axils of leaves or branches or on spines. **Flowers** mostly functionally unisexual with staminodes in female and pistillodes in male flowers, pedicels articulate at or near base. **Sepals** 5, equal, imbricate in bud, margin fimbriate, ciliate or rarely subentire. **Petals** 5, imbricate in bud, margin ciliate or laciniate, rarely entire, spreading or reflexed. **Disc** intrastaminal, convex or concave, 5–10-lobed, yellow or red. **Stamens** 5, arising at base of disc; anthers introrse. **Ovary** a quarter to half immersed in disc, (2)3(4)-locular with 2(3) erect, collateral ovules per locule; style terete, short or elongate; stigma (2)3(4)-lobed. **Fruit** a dry capsule opening longitudinally, loculicidal and septifragal, globose, obconic, trigonous, triquetrous, pyriform or conic-pyramidal, smooth to rugose, veined; pericarp semi-fleshy, chartaceous, coriaceous, woody or ridged. **Seeds** 1–4, glossy, reddish brown or black; aril fleshy or thin, completely to partially covering seed, or reduced to a rim at base of seed. $x = 10$ (9) (aneuploids, high polyploidy).

Species ± 80, extending over most of Africa and Madagascar, as far north as Spain in southern Europe and eastwards as far as India, Sri Lanka, Malesia and NE Australia and Polynesian Islands; 30 in sthn Afr., widely distributed.

Hippocratea L. 4661000

Linnaeus: 1191 (1753); Linnaeus: 498 (1754); Loesener: 226 (1893); Smith: 359 (1940); Ding Hou: 31 (1963) considers this a monotypic American genus; Robson: 46 (1965) takes broad view; Hallé: 1 (1986) and Robson *et al.*: 43 (1994) recognise segregate genera.

Lianes or scandent shrubs or small trees, unarmed, occasionally with latex. **Leaves** opposite or subopposite, entire or toothed, with petiole often articulated at base; stipules free or united interpetiolarly, caducous. **Inflorescences** pedunculate, cymose, dichasial or submonochasial, axillary; often with accessory branches. **Flowers** bisexual. **Sepals** (4)5, imbricate, more or less free. **Petals** (4)5(6), green, white or yellow, valvate or imbricate in bud. **Disc** extrastaminal, single or double, conical to saucer-shaped, free or variously united with other floral parts. **Stamens** (2)3(4), arising inside disc, usually shorter than petals; filaments broadened below, free or adnate at base or to ovary or gynophore; anthers ex-

trorse, didynamous, (1)2-thecous, with thecae at length confluent; pollen simple or polyads. **Ovary** free or confluent with disc, often 3-lobed, 3-locular, with 2–20 ovules in 2 series in each locule; style developed or obsolete, trifid. **Fruit** separating into 3 capsular mericarps, connate at base or rarely for most of their length; carpels dorsiventrally flattened or rarely biconvex, dehiscing by median suture or rarely indehiscent. **Seeds** with long stalks, rarely sessile, stalk usually expanded into a wing with raphe forming a submedial or marginal vein and thickened integuments forming a vein along other margin; germination epigeal or hypogeal. $x = 14$ (polyploidy).

Species ± 120. Differences of various segregate genera, mainly applied in tropical America and other parts of the world, are based on somewhat subtle variations in the shape of buds, arrangemcnt of petals and position and shape of the nectar disc. In Africa distinctions appear less marked. Perhaps the rank of subgenus under *Hippocratea* should be advocated, but it may well be that the segregate genera *Loeseneriella* A.C.Sm., *Reissantia* Hallé, *Elachyptera* A.C.Sm., *Prionostemma* Miers and *Pristimera* Miers will have to be used in sthn Afr. The following key would then be applicable, with number of sthn Afr. species indicated. *Hippocratea* in strict sense comprises only 2 species in tropical America and tropical Africa.

1a Flower bud conical; petals valvate or subimbricate in bud.....*Loeseneriella* (2)
1b Flower bud globose; petals imbricate in bud:
  2a Accessory branches in inflorescence absent; ovules 4–20 per locule; seeds 2 or more per mericarp:
    3a Petals unguiculate, lamina ovate to subcircular; leaves with prominent reticulate venation..... .....*Prionostemma* (1)
    3b Petals not unguiculate, elliptic to oblong; leaves without obvious reticulate venation... *Pristimera* (2)
  2b Accessory branches in inflorescence present; ovules 2 per locule; seeds 2 per mericarp:
    4a Disc deeply cup-shaped.....*Elachyptera* (1)
    4b Disc a low pad, narrowly sinuous.....*Reissantia* (3)

Lauridia Eckl. & Zeyh. 4647000

Ecklon & Zeyher: 124 (1834/1835); Sonder: 468 (1860b); Hooker: 363 (1862); Davison: 338 (1927); Robson: 39 (1965) in part; Archer & Van Wyk: 227 (1997c).

Cassine L. in part, Davison: 331 (1927).

Small evergreen trees, scrambling shrubs or lianas, unarmed, glabrous; bark with yellow pigment usually present or hardly discernible. **Branchlets** 4-lined to subangular. **Leaves** opposite, elliptic to ovate, entire to crenulate-denticulate; stipules minute, triangular, brownish black, marcescent. **Inflorescences** sessile or pedunculate, axillary, compact thyrsoid with cymules along straight central axis, or irregularly dichasial. **Flowers** bisexual, sessile. **Sepals** 4(5), equal, widely ovate. **Petals** 4(5), cream to white, widely elliptic to ovate; margin entire. **Disc** fleshy, entire. **Stamens** 4(5), ± erect, arising from and united at base with margin of disc; anthers introrse. **Ovary** ± immersed in and adnate to disc, 2-locular, with 2 erect, collateral, hypotropous, ventral ovules per locule; style very short or absent; stigma usually conspicuously lobed. **Fruit** baccate, red to purple or purplish black, spheroid; mesocarp fleshy. **Seeds** 1 or 2 per fruit, spheroid; seed-coat brown; endosperm present, fleshy; embryo erect, with fleshy, widely elliptic to widely ovate cotyledons.

Species 2, endemic to sthn Afr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Lydenburgia N.Robson 4629010

Robson: 35 (1965).

Catha Forssk. ex Scop. in part, Codd: 124 (1966); Van Wyk & Prins: 202 (1987).

Shrubs or trees, unarmed, glabrous; stems terete or angular; powdery yellow pigments in bark. **Leaves** often alternate when young, becoming opposite with age, lamina dark green or greyish green and glossy above, paler beneath, coriaceous or subcoriaceous; stipules long, triangular-acicular, caducous. **Inflorescence** a dichasium, 30–40-flowered, pedunculate. **Flowers** bisexual; bracts acicular to triangular. **Sepals** 5, ovate to semi-orbicular. **Petals** 5, oblong, margin entire, whitish. **Disc** fleshy, greenish, subentire with prominent sinuses at points where stamens arise. **Stamens** 5; filaments ± united at base; anthers basifixed, versatile, latrorse. **Ovary** 3-locular, ovoid, 2 ovules per locule; styles long. **Fruit** a 3(4)-valved capsule, narrowly elliptic to tri- or tetragonous, apex truncate and slightly concave; valves usually with prominent sepal ridges on inner surface. **Seeds** 1–3(4), elongate, trigonous, without or with a very reduced aril, rugose-papillose; endosperm fleshy.

Species 2, narrow endemics in sthn Afr. in Sekhukhuniland (Northern Province) and Pondoland (Eastern Cape). *Lydenburgia* is provisionally accepted awaiting critical morphological investigation. The strongest indication for separation are the vaalens compounds in *Lydenburgia* (Begley *et al.* 1990).

Maurocenia Mill. 4644000

Miller: [859] (1754); Sonder: 465 (1860b); Kuntze: 147 (1891), in part; Davison: 343 (1927); Loesener: 179 (1942); Archer & Van Wyk: 7 (1998a).

Maurocenia Mill. subg. *Eumaurocenia* Kuntze: 149 (1891).

Small evergreen shrubs to spreading trees, unarmed, glabrous; bark greyish with layers of powdery yellow pigment in exposed bark. **Branchlets** terete or slightly flattened, greyish brown. **Leaves** opposite; lamina widely elliptic to circular, dark green above, grey-green below, base rounded to cuneate, apex rounded to retuse, margin entire, revolute, coriaceous and rigid; venation brochidodromus, slightly raised above and more prominent below, midrib and petiole very conspicuous below owing to whitish green colour contrasting with grey-green lamina in dried leaves; petiolate; stipules minute, ± triangular, brownish black, marcescent. **Inflorescences** sessile, ± irregularly dichasial, axillary towards apices of branchlets, 4–10-flowered; bracts minute. **Flowers** often unisexual with staminodes, or bisexual; shortly pedicellate. **Sepals** 5, rudimentary. **Petals** 5, white, ovate, sessile, apex rounded, margin ± deflexed. **Disc** fleshy, entire, undulate. **Stamens** 5, ± erect; inserted below margin of disc; filaments of perfect flowers relatively long, well exserted above flowers; filaments of female flowers rudimentary (staminodes); anthers basifixed, introrse. **Ovary** ± immersed in and adnate to disc, 2(3)-locular with 2 pendulous collateral ovules per locule; ovules epitropous, dorsal; styles short; stigma in female flowers often conspicuously 2-lobed, papillate, stigma inconspicuous in perfect flowers. **Fruit** baccate, pale red, spheroid, mesocarp fleshy. **Seeds** 1 or 2 per locule (up to 5 per fruit), brown, ± spheroid; endosperm fleshy; embryo erect, with cotyledons fleshy, widely elliptic, base unequal.

Monotypic: *Maurocenia frangula* Mill. (note spelling of specific epithet), restricted to kloofs or coastal bush in Cape Peninsula and the West Coast National Park, Western Cape.

Maytenus Molina 4626000

Molina: 177 (1782); Loesener: 138 (1942); Blakelock: 237 (1956); Marais: 381 (1960) in part; Robson: 358 (1966) in part; Sebsebe Demisew: 45 (1985) in part.; Sebsebe Demisew & Robson: 331 (1989) in part; Robson *et al.*: 3 (1994) in part.

Gymnosporia in sense of Davison: 290 (1927) in part.

Trees or shrubs, without spines, erect or scrambling. **Leaves** alternate or spiral, usually subsessile, entire or serrated; sometimes with latex; stipules free, small, soon deciduous. **Inflorescences** pedunculate or sessile, monochasial or fasciculate, few-flowered, single in axils of foliage leaves or in clusters; bracts persistent. **Flowers** bisexual. **Sepals** (4)5, unequal or equal, imbricate, with margin entire or ciliolate. **Petals** (4)5, imbricate in bud, spreading, longer than sepals, oblong to suborbicular, with margins entire, undulate or ciliate, white, yellow, green or red. **Disc** intrastaminal, 5–10-lobed, angled or crenulate. **Stamens** (4)5; filaments flattened, shorter than petals; anthers versatile or basifixed, introrse. **Ovary** sessile, almost free or up to half immersed in disc, (1)2- or 3-locular, with 2 erect collateral ovules per locule; style usually short; stigma shortly (1)2- or 3-lobed. **Fruit** a smooth or rugose capsule, without emergences, dehiscing loculicidally to base. **Seeds** 1–6, glossy, subglobose, reddish brown, with complete or incomplete aril; with or without fleshy endosperm. $x = 9$ (polyploidy).

Species ± 150, mostly in tropics and subtropics of both hemispheres, widespread in the eastern parts of tropical and sthn Afr.; ± 11 in sthn Afr., widespread.

Mystroxylon Eckl. & Zeyh. 4642000

Ecklon & Zeyher: 125 (1834/1835); Loesener: 176 (1942); Robson: 29 (1965); Robson: 376 (1966); Robson *et al.*: 21 (1994); Archer: 107 (1996); Archer, Van Wyk & Condy: 76 (1997).

Mystroxylon Eckl. & Zeyh. sect. *Eumystroxylon* Loes.: 178 (1942).

Evergreen, rarely deciduous, shrubs or trees, unarmed, sparingly to densely pubescent; bark without yellow pigment, greyish to dark brown, surface smooth to longitudinally and transversely fissured; fissures often cutting deep into bark. **Branchlets** terete, smooth, usually pubescent, becoming greyish brown. **Leaves** alternate, coriaceous, margin glandular-crenate to glandular-crenulate, crenations 10–18 on either side; petiolate; stipules minute, ± triangular, pubescent, occasionally becoming glabrous, marcescent. **Inflorescences** sessile to pedunculate, composed of fasciculate cymes, axillary, 1–15-flowered; bracts minute. **Flowers** bisexual, pedicellate. **Sepals** 5, green, ± deltoid, with margin laciniate, equal, pubescent. **Petals** 5, greenish yellow, circular or depressed-ovate, margin entire or sparingly ciliolate, spreading. **Disc** fleshy, entire. **Stamens** 5, spreading, arising from and united at base with margin of disc; anthers introrse, dehiscing by longitudinal slits. **Ovary** three-quarters immersed in and adnate to and ± flush with disc, 3- or 4-locular, with 2 erect, collateral ovules per locule; style very short or absent, stigma inconspicuously lobed. **Fruit** a drupe, yellow-brown to bright red, ± spheroid; endocarp thin and crustaceous; mesocarp fleshy, the inner part often crustaceous or woody, resembling part of endocarp. **Seed** usually single, seed coat light brown, postchalazal vascular bundles often present; endosperm present; embryo erect, foliar.

Monotypic: *Mystroxylon aethiopicum* (Thunb.) Loes., a widespread and very polymorphic species in Africa and the Mascarene Islands; 4 subspecies are recognised for sthn Afr., Namibia, Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Pleurostylia Wight & Arn. 4646000

Wight & Arnott: 157 (1834); Davison: 342 (1927); Loesener: 180 (1942); Robson: 381 (1966); Robson *et al.* 27 (1994); Archer: 174 (1996).

Cathastrum Turcz.: 448 (1858).

Trees or shrubs, unarmed, glabrous, often with conspicuous orange pigments in exposed bark. **Leaves** opposite, lamina broadly elliptic, elliptic, or ovate to lanceolate, base acute to acuminate, apex rounded to slightly obtuse or acuminate, coriaceous, margin entire; venation usually conspicuous; petiolate; stipules minute, ± triangular, brown, marcescent. **Inflorescences** pedunculate, compact dichasial, axillary; bracts minute. **Flowers** bisexual, pedicellate. **Sepals** (4)5, subcircular to depressed-ovate, margin fringed. **Petals** (4)5, greenish white, ovate, sessile, margin entire, apex rounded. **Stamens** (4)5, erect, arising in sinuses in margin of disc; anthers dorsifixed, introrse. **Disc** subangular, with sinuses at point where stamens arise, flat. **Ovary** ± a quarter immersed in and adnate to disc, 2-locular, 1 infertile, with 2–4 erect, collateral ovules per locule; style short; stigma discoid, style and stigma occupying a lateral position on growing fruit due to development of 1 locule only. **Fruit** small, nut-like, ± ellipsoid with scar of stigma on one side below middle; pericarp thin, leathery, with fibrous bands arranged lengthwise on inside of pericarp. **Seeds** dark brown, ellipsoid, elliptic to broadly elliptic; fleshy endosperm present; embryo erect, cotyledons fleshy.

Species 3–5, with poor delimitation, in Africa, Mascarene Islands and Australasia; 1 widespread in Africa: *Pleurostylia capensis* (Turcz.) Loes., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Pseudosalacia Codd 4662010

Codd: 565 (1972).

Trees, glabrous, unarmed; bark greyish, smooth. **Leaves** alternate, ± elliptic, very large, coriaceous, entire, petiolate; stipules 0. **Inflorescences** short, 1–7-flowered cymes or fascicles. **Flowers** bisexual. **Sepals** 5, shortly united, imbricate, persistent, becoming reflexed. **Petals** (4)5(6), spreading, subrotund, subentire. **Disc** fleshy, obscure, 5-angled. **Stamens** 5, alternating with petals, subsessile, arising from small protuberances near margin of disc. **Ovary** 3-locular, almost completely immersed in disc, with 2 collateral, erect ovules per locule; style subobsolete. **Fruit** capsular, eventually dehiscent, large, globose; pericarp thick, leathery, minutely verrucose. **Seeds** 2–5, brown, glabrous, trigonous; endosperm present.

Monotypic: *Pseudosalacia streyi* Codd, rare in coastal forest of S KwaZulu-Natal.

Pterocelastrus Meisn. 4630000

Meisner: 68 (1837); Walpers: 535 (1842); Sonder: 461 (1860b); Brown: 16 (1906); Davison: 321 (1927); Burtt Davy: 447 (1932); Loesener: 156 (1942); Robson: 374 (1966).

Celastrus L. in part, Candolle: 5 (1825). *Asterocarpus* Eckl. & Zeyh.: 122 (1834/1835). (*Pterocelastrus* Meisn. to be conserved against *Asterocarpus* Eckl. & Zeyh.)

Trees or shrubs, sometimes scandent, without spines, glabrous, often with conspicuous orange pigments in exposed bark; branches brownish grey, terete; branchlets angular. **Leaves** alternate, entire, coriaceous, petiolate; stipules free, small, thick, deciduous. **Inflorescence** a pedunculate or rarely sessile, few- or many-flowered dichasium, in axils of foliage leaves or rarely in axil of bracts forming pseudopanicles; bracts persistent. **Flow-**

ers bisexual, pedicellate. **Sepals** 5, membranous, unequal, imbricate, ± connate, with margin entire to laciniate. **Petals** 5, elliptic, imbricate in bud, spreading, white or greenish white to cream or pale yellow, often brownish-flecked. **Disc** fleshy, scarcely 5-lobed or crenulate and half enveloping ovary. **Stamens** 5, with ± flattened filaments, connate to base of disc; anthers versatile, introrse. **Ovary** superior, sessile, almost free or up to half immersed in disc, (2)3-locular, with 2 erect ovules per locule; style short, cylindric, terete; stigma (2)3-branched. **Fruit** a dry, woody, dehiscent capsule, often waxy or fleshy, with abrupt horn- or wing-like emergences which may be variously divided. **Seeds** 1–3, glossy, red-brown, almost completely covered by a thin yellow aril, with fleshy endosperm.

Species 3, southeastern Africa, occurring as far north as Mozambique, Zimbabwe and Malawi; sthn Afr.: Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Putterlickia Endl. 4628000

Endlicher: 1086 (1840); Davison: 336 (1927); Robson: 5 (1965); Jordaan & Van Wyk: 322 (1998b).

Glabrous evergreen shrubs, often spreading or straggling, or woody climbers, spinescent, with long shoots and brachyblasts. **Spines** straight or backward-pointing, axillary, occasionally leafy and floriferous, with only one node. **Branches** angular or terete and reddish brown when young, becoming terete and grey with age, lenticellate, smooth or verrucose. **Leaves** alternate or fasciculate, subsessile, glabrous; stipules free, small, subulate, marcescent. **Inflorescences** lax to dense, few to many-flowered dichasia or monochasia, in axils of leaves or in clusters on brachyblasts. **Flowers** bisexual, hypogynous, pedicellate. **Sepals** 5, subequal, imbricate, free or united at base, margin ciliolate. **Petals** 5, imbricate in bud, spreading or suberect, cream or white. **Disc** intrastaminal, single, convex, shallowly 5-crenate. **Stamens** 5, free, subterete; filaments slender, arising at base of disc; anthers basifixed, slightly versatile, latrorse. **Ovary** sessile, a quarter to half immersed in and adnate to disc, 3-locular; ovules (4–)6(–12) per locule; placentation axile with ovules arranged in 2 rows; style short, cylindric; stigma 3-lobed. **Fruit** a dry capsule, dehiscing loculicidally to base; capsules cream to pink or red, obconic-trigonous, smooth. **Seeds** 6–18, glossy, reddish brown, with fleshy endosperm, completely enveloped by a well-developed, fleshy, orange aril.

Species 4, confined to S Mozambique and sthn Afr.: Mpumalanga, Swaziland, KwaZulu-Natal, Northern, Western and Eastern Cape.

Robsonodendron R.H.Archer 4642010

Archer & Van Wyk: 116 (1997a).

Mystroxylon Eckl. & Zeyh. sect. *Pseudoscytophyllum* Loes.: 178 (1942).

Evergreen shrubs or trees, unarmed, glabrous with elastic threads of trans-1, 4-polyisoprene in bark; bark without yellow pigment. **Branchlets** ± 4-lined, ± rugulose. **Leaves** alternate; elastic (rubber) threads evident on breaking lamina; stipules minute, marcescent, brownish black. **Inflorescences** sessile, composed of fasciculate cymes. **Flowers** bisexual, pedicellate. **Sepals** 5, unequal, outermost pair larger, fleshy, ± deltoid, laciniate; inner pair membranous, enlarged, remaining sepal ± intermediate between outer and inner pair. **Petals** 5, cream, oblong, margin entire. **Disc** fleshy, entire. **Stamens** 5, erect, arising from and united at base with margin of disc; anthers introrse. **Ovary** ± immersed in and adnate to disc, 2-locular, with 2 erect, collateral ovules per locule; style very short or absent; stigma inconspicuously lobed. **Fruit** a drupe, white or yellow to light brown, spheroid, 5–10 mm in diameter; endocarp thin and crustaceous; mesocarp fleshy. **Seeds** 1 or 2 per fruit; seed coat brown; endosperm present, fleshy; embryo erect, linear.

Species 2, endemic to sthn Afr. in forests or coastal bush, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Salacia L. 4662000

Linnaeus: 159, 293 (1771); Harvey: 230 (1860); Robson: 391 (1966); Robson *et al.*: 33 (1994).

Shrubs, or small trees, often with upper branches scandent, rarely rhizomatous shrublets, unarmed; with or without latex. **Leaves** opposite, subopposite or sometimes alternate, entire or toothed, petiolate; stipules free, deciduous. **Inflorescences** pedunculate or sessile, cymose, dichasial or monochasial or fasciculate, simple, without accessory branches, axillary or extra-axillary. **Flowers** bisexual or functionally unisexual. **Calyx** 4- or 5-partite, imbricate; segments ovate, inner ones sometimes ± petaloid. **Petals** (4)5(6), variously coloured, imbricate in bud, spreading, sometimes with membranous apex, sometimes adnate to disc. **Disc** extrastaminal, thick, expanded or conical, often sinuate, sometimes of 5 transversely oblong lobes, variously united with other flower parts. **Stamens** (2)3(4), arising inside disc, usually shorter than petals; filaments linear and sometimes globose at base or expanded and ovate, becoming reflexed; anthers versatile, extrorse or apical. **Ovary** half-confluent with disc, 3-lobed, 3-locular, with 2–4(–8) ovules in 1 or 2 series in each locule; style long or short; stigma simple or 3-lobed. **Fruit** baccate, fleshy, globose or 1–3-locular, soon becoming 1-locular by evanescence of dissepiments, 1–4(–20) seeds; exocarp supple or tough; mesocarp soft, fleshy; endocarp mucilaginous. **Seeds** (pyrenes ?) usually large, angled or globose; integuments thin; germination hypogeal. $x = 14$.

Species ± 200, cosmopolitan in tropical regions; 5 in sthn Afr., Namibia, Botswana, Northern Province, Gauteng, Mpumalanga and KwaZulu-Natal; mainly in subtropical forest areas.

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Ceratophyllaceae

(Magnoliidae—Ceratophyllales)

Compiled by R.P. Glen

Submerged aquatic herbs, perennating by buds, sometimes annual, rootless, branches occasionally modified as 'rhizomes'; monoecious. **Stem** branched but not more than 1 branch at a node. **Leaves** in whorls, (3–)6–8(–10) at a node, filiform, once or more dichotomously branched, with 2 rows of minute teeth along ultimate segments, apical segments truncate, tipped with two spines; stipules 0. **Flowers** unisexual, solitary in axil of 1 leaf in a whorl, male and female usually on alternate nodes; perianth lobes 6–13, united at base, strap-shaped or obovate, margin often with a single hyaline spine or lacerated, apex similar to leaf apex; water-pollinated. **Male flowers** subsessile; stamens up to 30 in several whorls on a domed receptacle around pistillode; filaments short or 0; anthers oblong, extrose, 2-thecous, dehiscing longitudinally, immature anthers resembling perianth lobes, margins 1–3-spined; mature anthers detach and float to water surface where they dehisce and shed pollen onto plants below. **Female flowers** sessile or shortly pedicellate; staminodes 0; ovary superior, 1-carpellate, 1-locular, ovoid, tapering into a long style; ovule 1, pendulous, unitegmic. **Fruit** a 1-seeded nut, ovoid or ellipsoid, tipped by persistent style, often with additional marginal and basal spines, also often warty. **Seed** without endosperm. $x = 12$ (aneuploids, polyploidy).

A worldwide family of only 1 genus; ± 6 polymorphic species are presently recognised, each with several varieties or formae: sthn Afr.: species 2 or 3.

Cook: 60 (1990); Wilmot-Dear: 124 (1991); Wilmot-Dear: 125 (1997).

Ceratophyllum L. 2516000

Linnaeus: 325 (1753); Wilmot-Dear: 125 (1997).

Description as for family.

Taxa 2 or possibly 3 in sthn Afr.: *Ceratophyllum demersum* L. var. *demersum*, in Caprivi (Namibia), N Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland, Free State and coastal regions of KwaZulu-Natal, Western and Eastern Cape; in stagnant to fast-flowing water, tolerant of brackish estuarine water of high salinities but not found in alkaline, temporary pools. *C. muricatum* Cham. subsp. *muricatum* occurs in Mpumalanga and possibly elsewhere in sthn Afr.; in slow-flowing or stagnant water as well as seasonal, highly alkaline pools, not in brackish estuarine conditions. According to Wilmot-Dear (1997) sterile material with 3–4 times dichotomous leaves found in E KwaZulu-Natal and southern coastal regions of Western and Eastern Cape, could possibly be *C. submersum* L. var. *submersum*.

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Chenopodiaceae

(Caryophyllidae—Caryophyllales)

Compiled by M. Jordaan

Annual or perennial herbs, shrublets or shrubs, often halophytic or nitrophilous, farinose, lepidote, glabrous, with a mealy bloom of vesicular hairs or an indumentum of simple to branched hairs, sometimes fleshy; stems continuous or with distinct segments or joints; plants sometimes monoecious or dioecious. **Leaves** usually alternate, rarely opposite, simple, sometimes succulent; opposite and reduced to small lobes at apex of jointed internodes (articles) (in Salicornieae); stipules 0. **Inflorescences** compact or open cymes or panicles, or reduced to solitary axillary flowers; bracts and bracteoles present or 0. **Flowers** bisexual or unisexual, usually regular, sessile, monochlamydeous, small to minute, mostly green or grey. **Perianth** of 1–5 tepals, or absent from female flowers, free or often connate below, imbricate or almost valvate, persistent, sometimes enlarged and developing lobes with a horn or spines at back, or winged or becoming succulent in fruit. **Stamens** 1–5, opposite to, as many as, or fewer than tepals, hypogynous or perigynous; filaments usually free, occasionally connate at base; anthers exserted, 2-thecous with connective sometimes produced, thecae with or without a terminal appendage, often inflated and coloured, dehiscing by longitudinal slits; staminodes usually 0. **Disc** sometimes present. **Ovary** free and superior (half-inferior in **Beta*) 2- or 3-carpellate, 1-locular; ovule solitary, basal, campylotropous to amphitropous; stigmas usually 2–3(–6), sessile or on stylar arms. **Fruit** dehiscent or indehiscent, a utricle, achene or berry, dry or with membranous, crustaceous, or succulent pericarp, usually enclosed in and falling off with a bladdery perianth, rarely a hard nut. **Seed** often lenticular, subglobose or reniform; testa membranous to crustaceous; embryo straight, curved, annular or spiral, surrounding the endosperm (0 in *Salicornia*).

Genera ± 100, with ± 1 500 species, cosmopolitan, particularly common in semi-arid environments and in saline habitats; a few species have given rise to cultivars of agriculture; many occur as weeds of cultivation; sthn Afr.: genera 14 (2 exotic), species 164.

Ventenat: 253 (1799); Fenzl: 292 (1837); Moquin-Tandon: 1 (1840); Moquin-Tandon: 41 (1849); Hooker: 43 (1880); Volkens: 36 (1892); Ulbrich: 375 (1934); Williams & Ford-Lloyd: 353 (1974); Friis & Gilbert: 127 (1993); Kühn: 253 (1993).

Classification of Chenopodiaceae

I. Subfamily CHENOPODIOIDEAE
(Plants herbaceous; leaves well developed. Inflorescences mostly richly flowered, paniculate; perianth lobes usually 5, not or rarely modified in fruit; ovary superior or semi-inferior. Fruits surrounded by the persistent perianth or by bracteoles. Embryo annular or curved; endosperm present.):

1. Tribe **Beteae** (Fruit subtended by persistent perianth lobes, opening by a circumscissile lid. Ovary half-inferior.): **Beta*
2. Tribe **Chenopodieae** (Plants often with bladdery hairs. Flowers proterogynous, ebracteolate. Ovary superior.): *Chenopodium*, **Einadia*
3. Tribe **Atripliceae** (Flowers usually unisexual; male flowers with a perianth, female ones perianthless, bracteolate. Fruit surrounded by the accrescent bracteoles.): *Exomis*, *Manochlamys*, *Atriplex*
4. Tribe **Camphorosmeae** (Inflorescences usually spiciform or paniculate; flowers usually ebracteolate; perianth persistent in fruit, chartaceous, membranous or scarious.): *Bassia*, *Kochia*

II. Subfamily SALICORNIOIDEAE
(Plants succulent; stems often articulate. Leaves reduced. Flowers usually in groups of 3, sunken into cavities in the axis of spiciform inflorescences; perianth often 2–4-lobed. Embryo annular or curved, rarely straight.):

1. Tribe **Halopeplideae** (Leaves alternate, amplexicaul. Stems entire.): *Halopeplis*
2. Tribe **Salicornieae** (Leaves usually opposite, connate. Stems articulate.): *Halosarcia*, *Salicornia*, *Sarcocornia*

This subfamily is sometimes placed in its own family, Salicorniaceae J.Agardh (1858), e.g. by Scott (1977a).

III. Subfamily SALSOLOIDEAE (Plants herbaceous or succulent. Leaves, if developed, mostly linear. Flowers usually 1–3, in the axils of the bracts, usually bracteolate. Embryo spiral; endosperm 0.):

1. Tribe **Suaedeae** (Bracteoles scarious, small. Embryo plano-spiral.): *Suaeda*
2. Tribe **Salsoleae** (Bracteoles large, surrounding the flower bud. Embryo mostly conical-spiral.): *Salsola*

This subfamily is sometimes placed in its own family, Salsolaceae Moq. (1849), e.g. by Scott (1977a, b).

Key to genera

1a Plants with well developed, ± flat leaves; branches not articulate; plants mostly hairy, mealy or glandular, sometimes glabrous:
2a Plants glabrous; fruiting perianth hard, united in clusters; ovary semi-inferior ..... ***Beta**
2b Plants glabrous, mealy, pilose, or glandular; fruiting perianth membranous or fleshy; ovary superior:
3a Plants mealy when young; flowers unisexual; male flowers with 5-lobed perianth and 5 stamens; female flowers without perianth but surrounded by a pair of bracteoles that may be free or fused:
4a Bracts connate into a somewhat inflated, spongy, winged casing, with a small, apical opening ..... **Atriplex**
4b Bracts not connate, becoming subsucculent:
5a Flowers in axillary clusters, bisexual and male together ..... **Exomis**
5b Flowers in naked, terminal inflorescences ..... **Manochlamys**
3b Plants variously hairy to glabrous; flowers bisexual or female, all with perianth, not surrounded by bracteoles:
6a Fruit with a succulent pericarp, not enveloped by the perianth ..... ***Einadia**
6b Fruit with a membranous pericarp, enveloped by the perianth ..... **Chenopodium**
1b Plants apparently leafless or leaves narrow, usually subterete, or scale-like and imbricate:
7a Leaves distinct, though sometimes scale-like; stems entire, not jointed at nodes or not made up of apparently leafless succulent internodes (articles); leaves usually alternate; plants glabrous or hairy:
8a Fruiting perianth without obvious appendages:
9a Leaves reduced to small succulent scales, shorter than 2 mm, amplexicaul; flowers immersed in upper parts of stem, without bracts or bracteoles, forming cylindrical, lateral and terminal, spike-like inflorescences ..... **Halopeplis**
9b Leaves distinct, terete or flat, sometimes succulent, usually longer than 3 mm, not amplexicaul; flowers in axils of leaf-like bracts, subtended by 2 or 3 minute, scarious bracteoles, forming glomerules in leaf axils or at leaf base, some distance from axil ..... **Suaeda**
8b Fruiting perianth with 1 or more wings, spines, or tubercles:
10a Annual or perennial herbs or subshrubs; flowers usually 1–3, in axils of the bracts, bibracteolate; perianth horizontally winged at or above the middle ..... **Salsola**
10b Annual herbs; flowers in axillary clusters; fruiting perianth accrescent with spine-like or tubercle-like appendages, or membranous scarious wings at the back, bracts 0; bracteoles 0:
11a Fruiting perianth segments with spines or spine-like tubercles ..... **Bassia**
11b Fruiting perianth segments with membranous scarious wings ..... **Kochia**
7b Leaves apparently absent (much reduced or obsolete); stems jointed at nodes, apparently made up of leafless succulent internodes (articles); plants glabrous:
12a Annual herbs; adventitious roots not formed; flowers exposed or not, with or without a truncate lateral shield; seeds with a soft or hard testa ..... **Salicornia**
12b Perennial herbs or subshrubs; adventitious roots formed; flowers always exposed, each with a truncate lateral shield; seeds with a thin membranous testa, minutely hairy:
13a Fruiting spikes disarticulating into separate ring-like segments, cylindrical, corky; flowers concealed in spike; seed with hard crustaceous testa ..... **Halosarcia**
13b Fruiting spikes persistent, or breaking up irregularly; flowers exposed; seed with soft membranous testa ... **Sarcocornia**

Atriplex L. 2229000

Linnaeus: 1052 (1753); Linnaeus: 472 (1754); Volkens: 64 (1892); Baker & Clarke: 81 (1909); Wright: 442 (1910); Aellen: 383 (1940a); Brenan: 14 (1954); Aellen: 665 (1960); Brenan: 144 (1988); Friis & Gilbert: 130 (1993); Kühn: 267 (1993); Hedge: 63 (1997).

Blackiella Aellen: 423 (1938); Aellen: 398 (1940a); Aellen: 6 (1967).

Annual or perennial herbs, subshrubs or shrubs, ± scurfy or with a mealy grey to white indumentum of vesicular scales or glabrous; monoecious or dioecious with some bisexual flowers. **Leaves** well developed, alternate, rarely opposite, flat, entire to irregularly toothed or lobed, mostly petiolate. **Inflorescence** spiciform, paniculate, in sessile axillary clusters, or flowers rarely solitary. **Flowers** unisexual. **Male flowers** without bracteoles, with (3–) 5 small scarious tepals and 3–5 stamens, arising at base of perianth; filaments free or connate at base; ovary 0 or rudimentary. **Female flowers** bibracteate, bracteoles persistent, herbaceous, relatively large, slightly connate, rarely separate, increasing in size in fruit; fruiting bracts of varied shape, degree of fusion and ornamentation; perianth 0, rarely present; disc and staminodes rudimentary or 0; ovary ovoid or depressed-globose; ovule erect or pendulous on basal funicle; stigmas 2 or 3, diverging, filiform. **Fruits** heterocarpous, enclosed by persistent, accrescent, and often modified bracteoles, with pericarp free or slightly adherent, membranous and indehiscent. **Seed** vertical, rarely horizontal; pericarp membranous; testa thin and hard; endosperm present; embryo annular. $x = 9$ (aneuploids, high polyploidy).

Species ± 250, cosmopolitan, particularly in Australia, mainly in deserts, saline habitats and on waste ground in temperate and tropical regions; 19 in sthn Afr., some introduced and naturalised, mostly widespread.

Bassia All. 2239010

Allioni: 177, t. 4, fig. 2 (1766); Volkens: 70 (1892); Scott: 106 (1978a); Kühn: 269 (1993).

Chenoleoides (Ulbr.) Botsch.: 1408 (1976). *Chenolea* Thunb.: 9 (1781); Hooker: 59 (1880); Volkens: 70 (1892); Wright: 447 (1910); Botschantsev: 1462 (1973). *Kochia* Roth: 307 (1801) section *Bassiae* (All.) Boiss.: 925 (1879).

Annual or rarely perennial herbs with an indumentum of spreading or adpressed, usually barbellate hairs. **Leaves** well developed, alternate, small, thin or succulent, usually linear to oblong, entire, pubescent, subsessile. **Inflorescences** elongated, spike-like or spreading panicles. **Flowers** bisexual or unisexual, axillary, solitary or clustered, ebracteate, small. **Tepals** 5, membranous, glabrous, tomentose or woolly, urceolate, connate above the middle; fruiting perianth accrescent, chartaceous, smooth or with up to 5 horizontal spine-like or tubercle-like appendages. **Stamens** 5, exserted; anthers oblong; thecae broadly oblong, without appendages. **Ovary** broadly ovoid, without disc at base; ovule subsessile; style short; stigmas 2, exserted. **Fruit** ± circular, horizontally compressed or sometimes vertical, with membranous pericarp, free from seed coat. **Seed** orbicular, horizontal or vertical; testa hard; endosperm copious or 0, mealy; embryo horseshoe-shaped. $x = 9$.

Species ± 10, Eurasia, Africa and introduced to Northern America; 4 in sthn Afr., in salt marshes along the whole coastal belt and inland riverbanks, in Namibia, Northern, Western and Eastern Cape, and KwaZulu-Natal.

*Beta L. 2221000

Linnaeus: 222 (1753); Linnaeus: 103 (1754); Jussieu: 85 (1789); Hooker: 52 (1880); Volkens: 56 (1892); Ulbrich: 457 (1934); Aellen: 550 (1960); Ball: 91 (1964a); Brenan: 91 (1964); Zohary: 138 (1966); Ford-Lloyd & Williams: 89 (1975); Wilson: 277 (1984); Kühn: 265 (1993); Letschert: 31 (1993); Hedge: 20 (1997).

Erect annual, biennial or perennial herbs, with furrowed, glabrous stems; roots woody, fleshy or much swollen. **Leaves** alternate, large, broad, flat, entire or nearly so, long-petiolate. **Inflorescences** simple or paniculate, with spike-like branches, composed of small, (1)2–4-flowered clusters, flowers of each cluster fused by their basally indurated perianth, whole cluster falling off at maturity, bracteate; bract 1, herbaceous, small to abortive; bracteoles 2. **Flowers** bisexual, sessile. **Tepals** 5, green or whitish, sometimes petaloid, basally indurated at fruiting time and often connate with other flowers in the glomerule, perigynous. **Stamens** 5; filaments inserted on a glandular disc. **Ovary** semi-inferior, connate with perianth tube at base, 3-carpellate, ± trigonous; stigmas 2–5, sessile, ovate, papillose on inner surface. **Fruit** enclosed in perianths that are connate by their swollen bases to form a pseudocarp which becomes detached at maturity, opening by a lid (operculum); pericarp fleshy or hard. **Seed** horizontal, lenticular or reniform, smooth or glossy; testa crustaceous; endosperm copious, central; embryo subannular. $x = 9$ (polyploidy).

Species ± 12, mainly in the Euro-Siberian and Mediterranean regions; cultivars derived from *Beta vulgaris* L. are food plants including Beetroot, Sugarbeet, Spinach Beet, etc.; some of these have escaped from cultivation, especially in Western Cape.

Chenopodium L. 2223000

Linnaeus: 218 (1753); Linnaeus: 103 (1754); Thunberg: 245 (1823); Volkens: 60 (1892); Baker & Clarke: 77 (1909); Wright: 435 (1910); Aellen: 337 (1928); Brenan: 2 (1954); Brenan: 165 (1956); Aellen: 569 (1960); Brenan: 92 (1964); Aellen: 7 (1967); Scott: 205 (1978b); Wilson: 139 (1983); Brenan: 136 (1988); Friis & Gilbert: 128 (1993); Kühn: 266 (1993); Uotila: 24 (1997).

Blitum L.: 4 (1753). *Roubieva* Moq.: 289 (1834).

Annual, biennial or rarely short-lived perennial herbs, rarely becoming woody, with white vesicular or glandular hairs, or rarely glabrous; stems erect to ascending or prostrate, usually grooved or angular, yellowish, green or green-striped, sometimes red to purple, especially in branch and leaf axils; plants gynomonoecious. **Leaves** alternate, flat and mostly broad, entire or pinnatifid, membranous to ± fleshy, mostly petiolate. **Inflorescences** mostly cymose glomerulate clusters, variously arranged, axillary and terminal, spiciform or paniculate; ebracteate. **Flowers** small, often dimorphic; terminal flowers bisexual or male; lateral flowers usually female. **Tepals** (3)4 or 5, often keeled or winged, sometimes with fringed appendages, in fruit rarely becoming succulent or basally indurated. **Stamens** 1–5, usually free, hypogynous or subperigynous; filaments sometimes connate at base. **Disc** 0 or annular. **Ovary** horizontally flattened; ovule subsessile; style usually 0; stigmas 2–5, slender, free or sometimes connate below. **Fruit** enclosed in perianth; pericarp membranous, indehiscent, free or adherent to seed. **Seed** usually horizontal, oblique or vertical; testa normally thin, hard and brittle; endosperm present; embryo annular. $x = 9$ (8) (high polyploidy).

Species ± 150, cosmopolitan, ranging from temperate to tropical regions, often weedy; 23 in sthn Afr., probably mostly introduced, widespread.

*Einadia Raf. 2261010

Rafinesque: 121 (1838); Wilson: 199 (1983); Wilson: 161 (1984).

Perennial herbs or weak shrubs. **Leaves** opposite or alternate, linear to broadly hastate, mealy when young. **Inflorescences** racemose or open, paniculate clusters; pedicels constricted at apex. **Flowers** small; terminal flower of cluster bisexual; lateral flowers female, without staminodes. **Tepals** 5, rarely 4. **Stamens** 1–3, glabrous; disc 0. **Ovary** glabrous; stigmas 2, slender. **Fruit** not enveloped by perianth; pericarp membranous or succulent. **Seed** horizontal, lenticular with rounded margin; endosperm central, copious; embryo annular.

Species 6, 4 endemic to Australia and 2 to New Zealand; **Einadia nutans* (R.Br.) A.J.Scott subsp. *nutans* introduced in sthn Afr., Gauteng and Eastern Cape.

Exomis Fenzl ex Moq. 2226000

Moquin-Tandon: 49 (1840); Moquin-Tandon: 89 (1849); Hooker: 53 (1880); Volkens: 63 (1892); Wright: 441 (1910); Ulbrich: 500 (1934) in part; Aellen: 373 (1940b); Aellen: 11 (1967); Kühn: 267 (1993).

Subshrubs with dichotomous branching, ashy grey, with simple hairs, monoecious with few bisexual flowers. **Leaves** alternate, ovate to lanceolate, the larger ones hastate, entire. **Inflorescences** terminal spikes or axillary clusters. **Male flowers** without bracts; tepals 4 or 5, herbaceous, broadly linear, ± recurved and hood-like towards tip; stamens 5, filaments strap-like, slightly tapering towards apex, longer than tepals, and connate at base; staminodes 0; ovary rudimentary. **Bisexual flowers** bibracteate; bracteoles cylindrical, accrescent in fruit; tepals 3–5, sometimes 0, slightly united below; staminodes 0; ovary fully developed; styles 2, free or united below. **Fruit** beaked at top; pericarp fleshy, adherent. **Seed** vertical, elongate to roundish or laterally compressed, blackish brownish; testa firm, glossy, smooth; embryo annular; radicle pointing downward.

Species 1: *Exomis microphylla* (Thunb.) Aellen with 2 varieties, confined to dryish areas of sthn Afr.: Namibia, Free State, Northern, Western and Eastern Cape.

Halopeplis Bunge ex Ung.-Sternb. 2249000

Ungern-Sternberg: 102 (1866); Hooker: 64 (1880); Volkens: 74 (1892); Adamson: 359 (1950); Zohary: 154 (1966); Scott: 372 (1977a); Kühn: 271 (1993); Hedge: 123 (1997).

Succulent annual or perennial herbs, glabrous; stems not jointed. **Leaves** opposite or upper ones alternate, reduced to small, succulent scales, subglobose to ovoid, amplexicaul. **Inflorescences** densely spicate; bracts fleshy, spirally placed, suborbicular, persistent. **Flowers** bisexual, in triads, in axils of spirally arranged bracteal scales, connate to one another and adnate to bracts. **Perianth** small, connate, compressed 4-angled, 3-dentate at apex. **Stamens** 1–3, shortly exserted; thecae without connectival appendages. **Ovary** pear-shaped, ± laterally compressed; styles 2; stigmas 2, subulate. **Fruit** enclosed in perianth with a membranous pericarp. **Seed** ovoid to ± circular, compressed; endosperm copious, central; embryo hook-shaped. $x = 9$ (1 report).

Species 3, in southern Europe, W Asia, north and sthn Afr.; 1 in sthn Afr.: *Halopeplis amplexicaulis* (Vahl) Bunge ex Ung.-Sternb., saline habitats, West Coast.

Halosarcia Paul G.Wilson 2255020

Wilson: 28 (1980); Brenan: 147 (1988); O'Callaghan: 433 (1992); Friis & Gilbert: 132 (1993); Kühn: 273 (1993).

Arthrocnemum not of Moq. (1840) in strict sense: Ungern-Sternberg: 36 (1866) in part; Wright: 449 (1912) in part; Moss: 4 (1954) in part; Brenan: 18 (1954) in part; Tölken: 273 (1967) in part.

Perennial dwarf shrubs, usually thinly woody, low, glabrous, apparently built up of many, superposed, ± tubular

segments which are green or glaucous and ultimately shrivel and fall away from stem. **Leaves** opposite, forming an insignificant fleshy bilobed rim at apex of each internode; sclereids 0 in chlorenchyma. **Inflorescence** a spike-like cyme (thyrse), usually terminal to branchlets, consisting of 3-flowered cymules each in axil of opposite, usually connate succulent bracts. **Flowers** usually bisexual or rarely pistillate, sessile. **Perianth** 3-lobed at apex, funnel-shaped. **Stamens** 0–1, abaxial; filament initially turgid and terete, eventually lorate, sometimes indurated towards base. **Ovary** vertical, membranous or succulent, ovoid; ovule suspended from a basal funicle; style short, with 2 or 3 stigmas. **Seed** erect, ovoid to circular, smooth, coat membranous to crustaceous; perisperm present, lateral; embryo curved. $x = 9$.

Species 23, all confined to Australia, except *Halosarcia indica* (Willd.) Paul G.Wilson (= *Arthrocnemum indicum* (Willd.) Moq.) occurring on shores of the Indian Ocean from Somalia southwards to Mozambique, KwaZulu-Natal coast and on Madagascar, Sri Lanka, in India and northern coasts of Australia.

Kochia Roth 2240000

Roth: 307 (1801); Hedge: 104 (1997).

Bassia in part, in strict sense *Bassia* section *Kochia* (Roth) A.J.Scott: 107 (1978a); Kühn: 269 (1993).

Annual or perennial herbs or subshrubs; stems ascending or erect, rather slender, with a prominent indumentum of spreading or adpressed barbellate or smooth hairs, or almost glabrous. **Leaves** alternate, flat or semicylindrical, linear to lanceolate, sessile, not or scarcely fleshy. **Flowers** bisexual or unisexual, urceolate, solitary, or in pairs in leaf axils; bracteate or ebracteate. **Tepals** 5, membranous, connate to ± middle; in fruit developing variously-shaped spreading wings. **Stamens** (4)5, exserted; thecae broadly oblong-ovoid, without appendages. **Ovary** broadly ovoid; style elongate with 2 prominently papillose apical arms. **Fruit** enclosed within persistent segments, horizontally compressed. **Seed** horizontal; endosperm scanty; embryo horseshoe-shaped. $x = 9$ (aneuploids, polyploidy).

Species ± 5; Africa and Eurasia; 1 in sthn Afr.: *Kochia tricophylla* Stapf, Northern and Eastern Cape.

Manochlamys Aellen 2229020

Aellen: 379 (1940b); Adamson: 355 (1950); Aellen: 12 (1967).

Atriplex L. in part C.H.Wright: 442 (1910). *Exomis* Fenzl ex Moq. in part Kühn: 267 (1993).

Grey aromatic shrubs. **Leaves** alternate, hastate, roundish-cordate to ovate-lanceolate, entire. **Inflorescences** terminal spikes. **Flowers** unisexual. **Male flowers** with 5 tepals, ovate; stamens 5, longer than perianth. **Female flowers** with 3 or 4 very small tepals and 2 broad-based bracts; bracts becoming fleshy, encircling, but not covering fruit. **Fruit** white or greenish. **Seed** compressed with rounded margin, smooth, shiny, black, vertical; embryo ± circular.

Monotypic, sthn Afr.: *Manochlamys albicans* (Aiton) Aellen, Namibia, Northern Cape (Namaqualand) to SW Western Cape.

Salicornia L. 2257000

Linnaeus: 3 (1753); Linnaeus: 4 (1754); Moquin-Tandon: 113 (1840); Volkens: 77 (1892); Wright: 448 (1912) partly; Adamson: 357 (1950); Brenan: 20 (1954); Moss: 20 (1954); Ball: 1 (1964b); Tölken: 296 (1967); Brenan: 153 (1988); O'Callaghan: 432 (1992); Kühn: 274 (1993); Hedge: 130 (1997).

Arthrocnemum not of Moq. in strict sense.

Annual herbs, erect or decumbent, sometimes becoming thinly woody below, glabrous, appearing leafless, built up of many superposed, ± tubular-segments which are green to reddish and succulent, and ultimately shrivel, each segment at apex forming a little cup, with 2 short teeth, embracing base of next higher segment; branches opposite, articulated. **Leaves** much reduced, opposite, consisting of small connate scales. **Inflorescences** short or long, terminal and lateral, fleshy, cylindrical spikes; spike not disarticulating, persistent or breaking up irregularly. **Flowers** minute, bisexual, or occasionally a few unisexual, usually in clusters of 3, ± connate, a pair of clusters to each fertile segment, clusters on opposite sides and immersed in hollows at articulations of branches. **Perianth** angular, minutely 3- or 4-lobed, fleshy, opening in middle of a truncate flattened lateral shield, lobes hard and spongy in fruit, persistent. **Stamens** 1 or 2 per flower; thecae exserted, nonappendiculate. **Ovary** ovoid, vertical, narrowed to apex; ovule subsessile; style lacerated at apex. **Fruit** an utricle, ovoid or oblong in outline, enclosed in spongy perianth; pericarp membranous. **Seed** erect, small, compressed, ± oblong; testa thin membranous, minutely hairy; perisperm 0; embryo folded. $x = 9$ (high polyploidy).

Species ± 13, cosmopolitan, excluding Australia, 7 in Europe, mostly maritime; 4 in sthn Afr., sheltered saline situations near coast of Namibia, Northern, Western and Eastern Cape, and KwaZulu-Natal.

Salsola L. 2269000

Linnaeus: 222 (1753); Linnaeus: 104 (1754); Thunberg: 243 (1823); Volkens: 82 (1892); Baker & Clarke: 87 (1909); Wright: 451 (1912); Brenan: 23 (1954); Aellen: 21 (1961); Aellen: 13 (1967); Botschantsev: 989 (1969); Botschantsev: 140 (1972); Botschantsev: 597 (1974); Wilson: 314 (1984); Brenan: 159 (1988); Kühn: 275 (1993); Freitag & Rilke: 154 (1997).

Annual or more often perennial herbs, shrubs or subshrubs, glabrous or pubescent; hairs 1- or few-celled, papillose, vesicular, setose or variously branched. **Leaves** alternate, rarely opposite, usually semiterete or terete, fleshy, entire, sessile, narrow, often scale-like, sometimes linear-subulate, sometimes amplexicaul at base. **Inflorescences** clusters of loose or dense, simple or paniculate spikes, or flowers solitary, bracteate; bracts leaf-like or scaly; bracteoles 2, green at least in upper part, with wide hyaline margins ± enclosing the small flowers, often cucullate. **Flowers** axillary, usually bisexual, sessile, protandrous. **Tepals** 4 or 5, outer wider than inner, radially veined, each tepal developing in fruit above the middle a scarious horizontally spreading, translucent to opaque, pinkish to pale brown wing. **Stamens** 5 or less, antitepalous; filaments band-shaped, fused at ovary base or inserted on outside of disc; anthers linear, oval or sagittate in outline, often with a connective disc; disc thin or thick, often lobed, glabrous, glandular papillose or ciliate; apically with small or large, distinctly shaped appendages. **Ovary** globose, depressed or broadly ovoid, narrowed into style; ovule basal, subsessile, suspended from apex of an enlarged funicle; style short or long, thin or thick, rarely 0; stigmas 2, rarely 3. **Fruit** usually consisting of a utricle and adnate fruiting perianth, both shed together as an anemophilous diaspore; pericarp membranous or fleshy. **Seed** orbicular, with membranous testa, usually horizontal; endosperm almost 0; embryo plano- or conical-spiral, greenish. $x = 9$ (high polyploidy).

Species ± 150, in Europe, Asia, and Africa, introduced into America and Australia, in arid or semi-arid regions; 89 in sthn Afr., conspicuous under karroid conditions, in Namibia, Botswana, North-West, Northern Province, Free State, Northern and Western Cape; **Salsola kali* L., a native of Asia, is a very widespread weed.

Sarcocornia A.J.Scott 2255010

Scott: 366 (1977a); Wilson: 278 (1984); Brenan: 149 (1988); O'Callaghan: 433 (1992).

Salicornia L. in part, C.H.Wright: 449 (1910). *Arthrocnemum* not of Moq. (1840) in strict sense; Ungern-Sternberg: 36 (1866) in part; Baker & Clarke: 85 (1909) in part; Ulbrich: 379 (1934) in part; Brenan: 18 (1954) in part; Moss: 4 (1954) in part; Tölken: 273 (1967) in part.

Perennial herbs or subshrubs, glabrous, appearing leafless; branches made up of cylindrical segments (articles), cup-shaped or 2-lobed at apex, succulent, usually green or greenish to reddish; sclereids usually present in palisade tissue. **Inflorescence** a terminal spike-like thyrse, consisting of 3–12-flowered cymules, sessile in axils of bracts; bracts united in opposite pairs. **Flowers** minute, apparently embedded in the spongy mesophyll of the succulent axis, bisexual or unisexual by abortion, or plant dioecious. **Perianth** succulent, gamotepalous; apex truncate, exposed, the orifice a vertical slit; lobes 3 or 4, 2 lateral and 1 small, semicircular outer adaxial lobe. **Stamens** 1 or 2 per flower, on abaxial and adaxial side of ovary. **Fruiting** perianth spongy; pericarp membranous. **Seed** ovate to orbicular; testa weak, papillose or with slender hairs; endosperm 0; embryo horseshoe-shaped. $x = 9$ (high polyploidy).

Species ± 15, in Europe, Africa, Asia, North and South America, 3 native to Australia; 9 in sthn Afr., coast of Namibia, Northern, Western and Eastern Cape, and KwaZulu-Natal.

Suaeda Forssk. ex J.F.Gmel. 2261000

Forsskål: (1775); Gmelin: 797 (1776) name conserved and emended; Scopoli: 333 (1777); Volkens: 80 (1892); Baker & Clarke: 91 (1909); Wright: 450 (1912); Brenan: 21 (1954); Aellen: 27 (1961); Aellen: 20 (1967); Wilson: 310 (1984); Brenan: 154 (1988); Pedrol: 337 (1992); Kühn: 274 (1993); Akhani & Podlech: 133 (1997).

Annual or perennial herbs, or subshrubs, erect or prostrate, ± fleshy, usually glabrous to sparsely puberulous. **Leaves** alternate or in whorls of three, fleshy, entire, narrow, cylindrical or somewhat flattened. **Flowers** bisexual or unisexual, sessile, in clusters of (1–)3(–9) in upper axils of bracts, at length adnate to base of leaves, subtended by 2 or 3 minute, scarious, pellucid bracteoles. **Perianth** succulent, 5-lobed; lobes free or connate to middle, keeled, or rounded on back, sometimes cucullate or horned. **Stamens** 5, hypogynous or attached to perianth tube. **Ovary** free from or rarely united with perianth, hemispherical to conical, broadly sessile; ovule basal; stigmas 2–5. **Fruit** with membranous or sometimes spongy, thickened, indehiscent pericarp; pericarp thin, free from perianth; heterocarpy common. **Seed** horizontal or vertical, lenticular; testa smooth, thin, hard and glossy; endosperm 0 or scanty; embryo spiral. $x = 9$ (high polyploidy).

Species ± 110, cosmopolitan, mainly in the northern hemisphere; 6 in sthn Afr., widespread along seashores and in saline or brackish inland areas.

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Chrysobalanaceae

(Rosidae—Rosales)

Compiled by M. Jordaan

Evergreen trees, shrubs or rhizomatous geoxylic suffrutices; wood with abundant silica inclusions. **Leaves** alternate, simple, entire, coriaceous, lower surface with close, prominent, reticulate venation which delimits small stomatal cavities filled with hairs, sometimes with 2 glands on upper side of petiole or at junction of petiole with blade; stipules subulate or lanceolate, caducous or persistent. **Inflorescences** axillary, many-flowered, complex cymes or cymose panicles; bracts and bracteoles eglandular, completely concealing flower bud. **Flowers** bisexual, slightly irregular, strongly perigynous. **Calyx**: tube (receptacle) turbinate and often obliquely bent or cup-shaped and ± unilaterally gibbous, hairy inside throughout; lobes 5, free, obtuse and imbricate or triangular-acute and sometimes subvalvate. **Petals** 5, free, inserted in mouth of perianth tube, sessile or clawed, caducous. **Stamens** 6–10 or more, sometimes unequal, inserted in throat of perianth tube, connate at base into a short ring or unilateral bundle, sometimes almost free, about as long as perianth lobes; filaments subulate-filiform, white; anthers small, dorsifixed, 2-thecous, dehiscing longitudinally and introrsely. **Ovary** superior, adnate to one side of perianth tube; carpels 1, rarely 2 or 3, 2-locular, with a single, erect ovule in each locule, often villous; style arising at base of carpel(s), terete, often hairy, arcuate, included; stigma ± truncate. **Fruit** drupaceous, 1-seeded, ellipsoid, obovoid or globose; epicarp verrucose; endocarp hard, thick, with a rough, fibrous surface, with 2 basal obturators. **Seed** erect; endosperm 0. $x = 11$ (polyploidy).

Genera 17, species ± 490; restricted to the lowlands of the tropical and subtropical regions of both hemispheres, concentrated near the equator, especially in the Neotropics; sthn Afr.: genus 1, species 2.

Brown: 433 (1818) as Chrysobalaneae; Candolle: 525 (1825) as Rosaceae tribus Chrysobalaneae; Endlicher: 1251 (1840) as Rosaceae order Chrysobalaneae; Hooker: 601 (1865) as Rosaceae; Focke: 55 (1894) as Rosaceae subfamily Chrysobalanoideae; Prance: 1 (1972) as Chrysobalanaceae; White: 265 (1976); Prance & White: 1 (1988).

Parinari Aubl. 3405000

Aublet: 514, t. 204–206 (1775); Graham: 229 (1957); Graham: 48 (1960); Friedrich-Holzhammer: 1 (1968); Prance: 178 (1972); White: 265 (1976); White: 36 (1978); Prance & White: 107 (1988).

Parinarium Juss.: 342 (1789); Candolle: 526 (1825); Endlicher: 1252 (1840); Harvey: 596 (1862); Hooker: 607 (1865).

Description as for family.

Species ± 43, fairly cosmopolitan in tropics and subtropics, 6 in tropical Africa, of which 1 also in Madagascar; 2 in sthn Afr., Namibia, Botswana, the northern provinces, Swaziland and KwaZulu-Natal.

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Clusiaceae (Guttiferae)

(Dilleniidae—Guttiferales)

Compiled by C.L. Bredenkamp

Trees, shrubs or herbs, with resinous juice. **Leaves** opposite, subopposite or whorled, simple, glandular; stipules 0. **Flowers** regular, bisexual or unisexual. **Sepals** 4 or 5, quincuncial or decussate. **Petals** as many as sepals, free, usually convolute, sometimes imbricate or decussate, alternating with sepals. **Stamens** many, basically in 2 whorls of stamen fascicles (bundles), the outer often sterile (fasciclodes) or absent, with filaments variously united or free, inner fascicles variously united or free, very rarely each one reduced to a single stamen. **Ovary** superior, 2–many-locular; placentation usually axile, sometimes ± parietal; ovules 1–many; styles free, ± united or absent; stigmas as many as locules. **Fruit** a septicidal (rarely loculicidal) capsule or berry. **Seeds** carinate or arillate, without endosperm.

Genera 40, species ± 1 000, mainly tropical but Hypericoideae also northern temperate; sthn Afr.: 2 genera, 12 species.

Sonder: 117 (1860); Robson: 378 (1961); Adams: 231 (1962); Friedrich-Holzhammer: 1 (1968); Killick & Robson: 14 (1976).

Key to genera

Flowers bisexual; sepals 5; styles (2)3–5, elongate; ovules several to many per locule ..... **Hypericum**

Flowers unisexual, rarely bisexual; plants polygamous or dioecious; sepals 4; styles absent and stigmas sessile; ovules 1 per locule ..... **Garcinia**

Garcinia L. 5199000

Linnaeus: 443 (1753); Robson: 396 (1961); Killick & Robson: 20 (1976).

Trees or shrubs, usually with yellow juice, sometimes with leafy branches modified into thorns. **Leaves** opposite or in whorls of 3, sometimes large, usually entire, coriaceous, venation usually prominent, often with translucent glandular canals and brownish resin canals. **Flowers** terminal or axillary, solitary or in few- to many-flowered cymes, usually unisexual and plants then either dioecious or polygamous, or flowers rarely bisexual. **Sepals** 4(5), decussate. **Petals** 4(5), longer than sepals. **Male flowers**: stamens many, free or all connate in (3)4 or 5(–9) fascicles (bundles) with each fascicle forming a solid staminal column bearing free or partially fused filaments above, sometimes with a whorl of sterile stamen fascicles (fasciclodes) alternating with stamen fascicles or forming a cushion from which stamens arise; anthers opening by a circular rim or longitudinal slits. **Female** or **bisexual flowers**: usually with 4(5) stamen fascicles or staminode fascicles, similar to those of male flowers but smaller and with fewer members, sometimes with fasciclodes free or fused together in a ring at base of ovary. **Ovary** 2–many-locular with 1 ovule per locule; styles absent; stigma sessile, peltate, lobed, smooth or tuberculate. **Fruit** baccate. **Seeds** 1–4, large, arillate; embryo with minute cotyledons. $x = 8$ or 12 (high polyploidy).

Species ± 400, fairly cosmopolitan in tropical countries with a concentration in Asia; 2 in sthn Afr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape; in forests.

Hypericum L. 5168000

Linnaeus: 783 (1753); Sonder: 117 (1860); Bredell: 571 (1939); Robson: 379 (1961); Killick & Robson: 14 (1976).

Trees, shrubs or herbs. **Leaves** opposite, sessile, amplexicaul or shortly petiolate, entire, with translucent glandular dots or linear striae and frequently with dark submarginal glandular dots. **Flowers** terminal, solitary or cymose, sometimes forming a corymb or panicle, bisexual. **Sepals** usually 5, equal, subequal or unequal, with translucent gland dots or striae, with or without dark, often submarginal dots and sometimes with stalked marginal glands. **Petals** usually 5, usually yellow, often red-tinged, asymmetrical, with translucent or dark glandular dots or striae. **Stamens** usually very numerous, free or connate at base into 3–5 distinct or indistinct groups; filaments thread-like; anthers with or without yellow or black gland. **Ovary** sessile, ovoid or subround, 3–5-locular, with few to many ovules on parietal placentas in each locule; styles 3–5, free or variously united; stigmas small, capitate. **Fruit** a septicidal capsule with few to many seeds, rarely indehiscent. **Seeds** minute, cylindric to ovoid, straight or slightly curved; testa thin, ribbed, punctate or smooth; embryo straight or curved. $x = 8$ (7, 9, 10) (high polyploidy).

Species ± 400, widespread in temperate climates; 10 in sthn Afr., widespread, but mainly eastern regions, extending westwards along Cape coastal area to near Riversdale (Western Cape); **Hypericum perforatum* L., is an introduced weed in the Western Cape region (Henderson & Anderson 1966).

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Combretaceae

(Rosidae—Myrtales)

Compiled by C.L. Bredenkamp

Trees, shrubs, shrublets or climbers, rarely subherbaceous; indumentum of unicellular, compartmented (rarely non-compartmented) hairs, multicellular stalked glands and multicellular scales (in which the head consists of a multicellular plate only one cell thick). **Leaves** opposite, verticillate, spiral or alternate, simple and almost always entire (very rarely crenulate); stipules 0. **Flowers** bisexual or bisexual and male in same inflorescence or very rarely plants dioecious, usually 4- or 5-merous, rarely slightly irregular, in axillary or extra-axillary, elongated or subcapitate spikes or racemes or in terminal or axillary panicles. **Receptacle** (calyx tube or hypanthium) usually in two distinct parts: lower receptacle surrounding and adnate to the inferior ovary, upper receptacle usually produced beyond ovary to form a short or long tube terminating in (sometimes scarcely developed) sepals. **Sepals** 4 or 5 (rarely 6 or 8) or almost absent, sometimes accrescent. **Petals** 4 or 5 (rarely more) or absent, free, conspicuous or sometimes very small, usually inserted near mouth of upper receptacle. **Stamens** usually twice as many as sepals or petals but occasionally the same number, borne inside upper receptacle with biseriate or, more rarely, uniseriate insertion (one whorl very rarely as staminodes), exserted or included; anthers dorsifixed, versatile. **Disc** intrastaminal, hairy or glabrous, sometimes inconspicuous or absent. **Style** usually free (attached to upper receptacle for part of its length in *Quisqualis* and a very few species of *Combretum*). **Ovary** inferior, 1-locular with usually 2 (up to 6) pendulous anatropous ovules of which only 1 usually develops. **Fruit** a pseudocarp, very variable in size and shape, fleshy or dry, stipitate or sessile, usually indehiscent, occasionally tardily dehiscent, often variously winged or ridged, 1-seeded. **Seeds**: albumen absent; cotyledons 2 (rarely 3 or 4) occasionally with their petioles connate almost to apex.

Genera 20, species 500, cosmopolitan in tropics and subtropics; in sthn Afr.: genera 5, species 41.

Exell & Roessler: 1 (1966); Exell: 100 (1978); Carr: 13 (1988); Rodman: 45 (1990).

Key to genera

1a Inland trees, shrubs or lianes:
  2a Petals present:
    3a Calyx produced into a short, campanulate or cup-shaped limb above ovary:
      4a Flowers bisexual; fruit 4- or 5-winged or -angled ..... **Combretum**
      4b Flowers male and bisexual; fruit 2(3 or 4)-winged..... **Pteleopsis**
    3b Calyx produced into a long tube above ovary ..... **Quisqualis**
  2b Petals absent; calyx produced into a short, constricted tube above ovary; fruit 2–5-winged..... **Terminalia**
1b Coastal mangrove associate, with leathery leaves; fruit woody, compressed, obtusely angled, crowned with persistent calyx ..... **Lumnitzera**

Combretum Loefl. 5538000

Loefling: 308 (1758) name conserved; Sonder: 508 (1862); Exell: 101 (1978); Van Wyk: 125 (1984); Carr & Rogers: 173 (1987); Carr: 13 (1988); Carr & Retief: 38 (1989); Rodman: 45 (1990); Hennessy & Rodman: 149 (1995).

Poivrea Thouars: 28 (1811); Sonder: 512 (1862).

Trees, shrubs, shrublets or woody climbers, very rarely subherbaceous; lepidote or with microscopic and sometimes macroscopic stalked glands. **Leaves** opposite, or sometimes in whorls of 3 or 4, or rarely alternate, usually petiolate (rarely subsessile), almost always entire; petiole sometimes persisting (especially in climbers) forming a ± hooked spine. **Flowers** bisexual, regular, or slightly irregular, 4- or 5-merous, in elongated or subcapitate axillary or extra-axillary spikes or racemes or in terminal or terminal and axillary, often leafy panicles. **Receptacle** usually clearly divided into a lower part and an upper part which varies from patelliform to infundibuliform and is itself sometimes visibly differentiated into a lower part containing the disc (when present) and an often more expanded upper part. **Sepals**: lobes 4 or 5 (rarely more), deltate to ± subulate or filiform, sometimes scarcely developed. **Petals** usually 4 or 5 (rarely absent, in aberrant specimens and up to 7 in occasional flowers), small and inconspicuous to showy and exceeding the sepals, of various colours. **Stamens** twice as many as petals, inserted in 1 or more, usually 2, series inside upper receptacle and usually exserted. **Disc** glabrous or hairy, with or without a free margin, sometimes inconspicuous or absent. **Style** free (in sthn Afr. species); stigma sometimes ± expanded. **Ovary** completely inferior. **Fruit** 4- or 5-winged, ridged or angled, sessile or stipitate, indehiscent or rarely tardily dehiscent; pericarp usually thin and papery, sometimes leathery, more rarely fleshy. **Seeds**: cotyledons various. $x = 13$ (11, 12, 14) (high polyploidy).

Species 250, fairly cosmopolitan in warm climates, excluding Australia and Pacific Islands; ± 30 in sthn Afr., widespread in all countries and provinces, except in Free State (rare), Lesotho and Western Cape.

Lumnitzera Willd. 5550000

Willdenow: 186 (1803); Exell: 181 (1978); Carr: 159 (1988).

Mangroves: small evergreen trees or shrubs. **Leaves** alternate, sessile or subsessile, somewhat fleshy and coriaceous. **Flowers** bisexual, regular, 5-merous, in short terminal spikes or racemes, red, white, pink or yellow. **Receptacle** not externally differentiated into an upper and lower part but produced beyond inferior ovary to form a tube bearing 2 adnate persistent bracteoles and terminating in a 5-lobed persistent calyx. **Petals** 5, caducous. **Stamens** 5–10, 2-seriate. **Disc** inconspicuous. **Style** filiform, persistent, not adnate to wall of receptacle, not expanded at apex. **Ovary** with 2–5 ovules. **Fruit** indehiscent, ± woody, compressed-ellipsoid and obtusely angled, crowned by persistent calyx. **Seeds**: cotyledons unknown.

Species 2, 1 in tropical Asia, Northern Australia and Polynesia, the other in eastern and sthn Afr., Madagascar and Polynesia: *Lumnitzera racemosa* Willd. in KwaZulu-Natal, associate in mangrove swamps.

Pteleopsis Engl. 5539000

Engler: 25 (1894); Engler: 293 (1895); Exell: 162 (1978); Carr: 28 (1988).

Small or medium-sized trees or occasionally shrubs, without scales or stalked glands. **Leaves** opposite or subopposite, petiolate, entire, almost glabrous or hairy. **Flowers** andromonoecious, bisexual and male in same inflorescence, 4- or 5-merous, pedicellate, in terminal and/or axillary or extra-axillary subcapitate racemes. **Receptacle**: upper part campanulate, joined to lower receptacle by a slender stalk-like region; lower part somewhat flattened. **Bisexual flowers**: sepals deltate, little developed; petals 4 or 5, usually ± obovate; stamens 8–10, often 2-seriate; disc pilose with a short free margin; style not expanded at apex. **Male flowers** usually towards base of the inflorescence, as in bisexual ones but with ovary not developing and with a slender stalk replacing the lower receptacle (perhaps a true pedicel only towards base); style present or vestigial. **Fruit** 2–5-winged, often decurrent into comparatively long slender stipe. **Seeds**: cotyledons (where known) unfolding spirally and borne above soil level.

Species 9–11, all in tropical Africa; 1 in sthn Afr.: *Pteleopsis myrtifolia* (M.A.Lawson) Engl. & Diels, Botswana, Northern Province, Mpumalanga, Swaziland, and KwaZulu-Natal.

Quisqualis L. 5541000

Linnaeus: 556 (1762); Sonder: 512 (1862); Carr: 177 (1988).

Shrubs, scandent. **Leaves** opposite or subopposite, simple, oblong or obovate, acuminate, entire. **Flowers** showy, usually in a short, axillary or terminal spike or sometimes a raceme. **Receptacle**: tube ovoid below and elongated, cylindric above ovary. **Sepals**: lobes 5, short. **Petals** 5, longer than calyx lobes, oblong or suborbicular. **Stamens** 10, arising from within throat of calyx tube. **Ovary** with 3 or 4 ovules; style partly adnate to calyx tube; stigma subdilated. **Fruit** dry, leathery, oblong, acutely 5-angled, 5-winged and 5-furrowed, 1-seeded. **Seed** 5-angled and 5-furrowed. $x = 13$ (11, 12) (polyploidy).

Species 17, Africa, India, and Philippine islands; 1 in sthn Afr.: *Quisqualis parviflora* Gerrard ex Sond., Mpumalanga, KwaZulu-Natal and Eastern Cape.

Terminalia L. 5544000

Linnaeus: 674 ('638') (1767a); Linnaeus: 21 (1767b) name conserved; Exell: 168 (1978); Carr: 182 (1988).

Trees, usually small in our area but sometimes very tall elsewhere, or rarely shrubs, without scales or microscopic stalked glands. **Leaves** usually alternate, often crowded at ends of branches, sometimes on short shoots, rarely opposite, petiolate or subsessile, usually entire but occasionally subcrenate, often with 2 or more glands at or near base of lamina or on petiole. **Flowers** usually bisexual and male in the same inflorescence (rarely all bisexual), usually in axillary spikes with male flowers towards apex and bisexual ones towards base, rarely in terminal panicles; male flowers stalked, stalks resembling pedicels but corresponding to lower receptacle with abortion of ovary; bisexual flowers sessile. **Receptacle** divided into a lower and an upper part, often scarcely developed, expanding into a shallow cup terminating in sepals (or calyx lobes). **Petals** 0. **Stamens** usually 10, exserted. **Disc** intrastaminal. **Style** free, not expanded at apex. **Ovary** completely inferior. **Fruit** a pseudocarp, very variable in size and shape but usually 2-winged, usually with an, at least partially, sclerenchymatous endocarp. **Seeds**: cotyledons (where known) spirally convolute. $x = 12$ (7, 13) (high polyploidy, B-chromosomes).

Species 250, fairly cosmopolitan, throughout tropics and extending to subtropics; 7 in sthn Afr., widespread except in Free State, Lesotho, Western and Eastern Cape.

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Connaraceae

(Rosidae—Rosales)

Compiled by M. Jordaan

Lianas climbing by means of the winding ends of young branches, less often shrubs or small trees. **Leaves** alternate, imparipinnate; leaflets entire, persistent or deciduous, petiolate; petiole pulvinate at base; stipules 0. **Inflorescences** axillary or terminal racemes, panicles, or rarely in fascicles. **Flowers** bisexual, or rarely unisexual, regular; androecium and gynoecium dimorphic. **Sepals** 5, imbricate or valvate, free or connate at base, caducous or often persistent and sometimes ± accrescent in fruit to strongly so. **Petals** 5, free or sometimes slightly connate at middle, imbricate, rarely valvate. **Stamens** 10, in 2 whorls, free or connate at base, the 5 outer episepalous longer than the 5 inner epi-

petalous ones, which are often imperfect, hypogynous; filaments free or united basally into a short tube; anthers dorsifixed, 2-thecous, dehiscing lengthwise, introrse. **Gynoecium** superior, of (1–3)–5, free, hirsute, 1-locular carpels; ovules 2, collateral, nearly basal to nearly apical, anatropous to hemitropous. **Fruit** of 1–5 follicles, sometimes connate at base, usually dehiscing by a ventral suture. **Seed** 1(2) per follicle, with or without endosperm, hilum lateral to basal; testa partly to entirely fleshy, sarcotesta (aril) sometimes partly free.

Genera ± 12, species 110–200, cosmopolitan in tropics and subtropics; sthn Afr.: genera 2, species 2.

Brown: 431 (1818); Gilg: 61 (1894); Schellenberg: 311 (1915); Mendes: 615 (1966); Breteler: 1 (1989).

Key to genera

Apex of leaflets tapering, base asymmetric; flowers in terminal or axillary racemes, often clustered in old leaf bases; follicles velvety, ± rostrate ..... **Cnestis**

Apex of leaflets rounded, base symmetric; flowers in few-flowered, axillary racemes, usually produced before the leaves; follicles glabrous or glabrescent, mostly acute to rounded apically ..... **Rourea**

Cnestis Juss. 3428000

Jussieu: 374 (1789); Candolle: 86 (1825); Endlicher: 1140 (1840); Sonder: 527 (1860); Hooker: 433 (1862); Gilg: 67 (1894); Burtt Davy: 511 (1932); Mendes: 615 (1966); Lemmens: 174 (1989).

Lianas, shrubs or rarely small trees; branches cylindrical. **Leaves**: leaflets many-jugate, opposite or not, often asymmetric and often also acuminate. **Inflorescences** racemose, or occasionally in panicles, fascicles, or flowers solitary on main stem, axillary, usually more than 1 together in axil of single leaf, sometimes pseudoterminal. **Flowers** bisexual or unisexual with some bisexual, small, tomentose, heterostylous, often heterodistylous; pedicels with a distinct joint. **Sepals** ± free, imbricate in bud. **Petals** shorter, as long as or somewhat longer than sepals, free, white, yellowish or red-tinged, imbricate in bud, glabrous or with some hairs outside near base. **Stamens**: filaments free or shortly connate at base, glabrous; anthers usually recurved with age. **Gynoecium** of 5, free, sessile carpels; ovules 2 per locule; styles often pilose at base, short; stigmas capitate. **Follicles** 1–5 per flower, reniform or cylindrical, curved or undulated, beaked or not, opening lengthways along ventral suture, densely tomentose and sometimes also with long rigid hairs outside, velutinous and sometimes with rigid, easily detached, stinging hairs inside. **Seed** solitary, attached to base of follicle, ovoid, with yellow to red sarcotesta at base, surrounding the hilum; testa usually black and shiny; endosperm present, abundant. $x = 14$ (1 report).

Species ± 13, largely restricted to tropical Africa and Madagascar, but 1 species in tropical Asia; 1 in sthn Afr.: *Cnestis polyphylla* Lam., in Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and northern Eastern Cape.

Rourea Aubl. 3424000

Aublet: 467 (1775) name conserved; Jussieu: 369 (1789); Baillon: 228 (1867); Jongkind: 310 (1989).

Byrsocarpus Thonn. ex Schumach.: 246 (1827); Hooker: 431 (1862); Gilg: 66 (1894); Hemsley: 15 (1956); Mendes: 622 (1966).

Lianas, shrubs, or small trees; branches cylindric or clearly lobed, often ending in a tendrilloid tip; lenticels usually present. **Leaves**: leaflets many-jugate, opposite or subopposite, usually ± symmetric. **Inflorescences** axillary, paniculate or racemose, frequently more than 1 per axil of sometimes rudimentary leaf, sometimes 1– more together at end of leafy branch and resembling a terminal inflorescence; pedicel always with a distinct joint. **Flowers** bisexual, heterodistylous, sweet-scented, usually produced before leaves. **Sepals** free or almost completely connate, imbricate in bud, ciliate, persistent and usually accrescent soon after pollination. **Petals** as long as to much longer than sepals, free or connivent near base, often lorate and inrolled or folded, white often with a trace of yellow or red, glabrous or with a few apical hairs. **Stamens**: filaments connate into a short tube below, glabrous. **Gynoecium** of 5, free, glabrous to glabrescent carpels; ovules 2, basal; styles terete; stigmas ± capitate. **Follicles** 1–5 per flower, ovate to elliptic with rounded to acute apex or beaked, glabrous or velutinous, and/or with orange to red or rarely white glandular hairs outside, glabrous inside, with persistent calyx, dehiscing by a ventral suture or circumscissile at base. **Seed** solitary, rarely 2 per follicle, usually extruded, subovoid to ellipsoid, enclosed or partially so in a brightly coloured sarcotesta (aril) fused with the partly to almost totally fleshy testa; hilum basal; endosperm 0 in mature seed. $x = 14$ (1 report).

Species 40–70, circumtropical, occurring in forests and savannas; 1 in sthn Afr.: *Rourea orientalis* Baill., Caprivi and Botswana.

Jongkind (1989) divided the genus into 5 sections, the sthn Afr. species belongs to section *Byrsocarpus* (Thonn. ex Schumach.) Jongkind.

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Convolvulaceae

(Asteridae—Solanales)

Compiled by W.G. Welman

Herbs or shrubs, frequently twining, rarely leafless parasites (*Cuscuta*). **Leaves** alternate, simple, sometimes palmately or pinnately lobed (scale-like in *Cuscuta*); stipules usually 0. **Flowers** regular, bisexual, often showy, in pedunculate, bracteate, axillary cymes or sometimes solitary. **Calyx** (4)5(6)-partite, persistent, imbricate. **Corolla** united, usually only slightly 5-lobed, campanulate or funnel-shaped, rarely cylindric. **Disc** (nectary) often present and surrounding base of ovary. **Stamens** 5, alternating with corolla lobes, arising from base of corolla tube; filaments with anthers 2-thecous and dehiscing longitudinally. **Ovary** superior, 1–4-locular, entire or sometimes deeply lobed, with 1–4 basal ovules in each locule; styles 1 or 2, terminal on ovary or gynobasic, sometimes with the 2 styles connate at base; stigmas terete, capitate, dilated, or linear. **Fruit** capsular or indehiscent. **Seeds** as many as ovules or fewer, glabrous, villous, woolly, or verrucose; embryo straight; cotyledons foliaceous, sometimes small or 0 (*Cuscuta*); endosperm scanty to fairly copious.

Genera ± 55, species ± 1700, cosmopolitan, especially warm regions, mostly natives of tropical Asia and America, extending to Australia, Africa and Madagascar; sthn Afr.: 16 genera, 115 species.

Meeuse: 641 (1957); Verdcourt: 1 (1963); Gonçalves: 1 (1987); Meeuse & Welman: 1 (2000).

Key to genera

1a Leaves minute, scale-like or absent; yellowish twining parasites; flowers small, usually in clusters, often many ..... **Cuscuta**
1b Leaves well developed, green:
2a Ovary 2- or 4-lobed or -cleft; styles 2, inserted between lobes of ovary; prostrate herbs:
3a Ovary 2-cleft, with 2 ovules in each locule ..... **Dichondra**
3b Ovary 4-cleft, with 1 ovule in each locule ..... **Falkia**
2b Ovary not deeply lobed; style simple or if 2, then terminal; plants of various habit:
4a Styles 2, free or ± united at base:
5a Styles forked; stigmas 4, linear or subclavate ..... **Evolvulus**
5b Styles simple; stigmas 2, peltate or capitate:
6a Leaves greyish velvety pubescent above, densely coated with golden brown hairs beneath ..... **Bonamia**
6b Leaves glabrous to densely hirsute on both surfaces, but never as above ..... **Seddera**
4b Style 1, stigmas globose to linear:
7a Pollen smooth or with folds or ridges, but not spinulose:
8a Stigmas filiform, terete or subclavate:
9a Bracteoles small or narrow, usually ± remote from calyx ..... **Convolvulus**
9b Bracteoles large, ± enclosing calyx as an involucre ..... **Calystegia**
8b Stigmas globose, ovate, oblong or elliptic:
10a Ovary 1-locular; stigmas ovate; sepals unequal; corolla white or cream with purple centre. ..... **Hewittia**
10b Ovary 2(4)-locular:
11a Flowers in pedunculate, subglobose heads, usually blue; leaves entire or slightly lobed, cordate ..... **Jacquemontia**
11b Flowers in cymes, dichasia, or solitary, white or yellow, often with dark centre; leaves usually lobed or dissected, sometimes auricled at base, rarely entire:
12a Anthers at anthesis helically twisted; pollen tricolpate; leaves entire or deeply palmately or pinnately lobed or compound ..... **Merremia**
12b Anthers at anthesis straight; pollen pantoporate; leaves oblong to linear-lanceolate, much longer than broad with hastate, sagittate or truncate base ..... **Xenostegia**
7b Pollen spinulose:
13a Plants covered in all parts, except corollas, with stellate hairs; stigmas oblong ..... **Astripomoea**
13b Plants glabrous to densely hairy, but never with stellate hairs; stigmas biglobose or 3-lobed:
14a Fruit completely enclosed by the much enlarged calyx; pericarp thin, opening irregularly; seeds 4; leaves with dense black glandular dots on lower surface ..... **Stictocardia**
14b Fruit dehiscent or indehiscent, not as above; leaves without black glandular dots below:
15a Stamens arising directly from corolla tube; style not completely caducous in fruit ..... **Ipomoea**
15b Stamens arising from scales situated near base of corolla tube; style completely caducous in fruit ..... **Paralepistemon**

Astripomoea A.Meeuse 7000000

Meeuse: 709 (1957); Meeuse & Welman: 66 (2000).

Astrochlaena Hallier f.: 120 (1893a).

Annual or perennial herbs or undershrubs, not twining, sparsely branched, stellately pubescent. **Leaves** petiolate, usually ovate and entire. **Flowers** in cymes, sometimes paniculate, rarely solitary. **Calyx** of unequal sepals, often 2 innermost smaller. **Corolla** funnel-shaped; limb almost entire. **Stamens** included, inserted near base of corolla tube, usually 2 larger than others; filaments linear; anthers oblong, lobed at base or sagittate and sometimes with swollen hairs; pollen spherical, spinulose. **Disc** annular. **Ovary** subglobose, 2-locular, with 2 ovules in each locule; style simple, included; stigmas 2,

thick, oblong, obliquely truncate. **Fruit** a capsule. **Seeds** with short or cobwebby hairs. $x = 15$ (1 report).

Species ± 12, Africa; 3 in sthn Afr., Namibia, Botswana, Swaziland, KwaZulu-Natal.

Bonamia Thouars 6979000

Du Petit-Thouars: 8 (1804) name conserved; Myint & Ward: 121 (1968); Meeuse & Welman: 29 (2000).

Breweria R.Br. in part: 487 (1810).

Herbaceous or woody twiners, rarely erect undershrubs. **Leaves** entire. **Flowers** axillary, solitary or cymose, sometimes in leafy panicles; bracteoles small. **Calyx** 5-parted; sepals usually equal or subequal. **Corolla** funnel-shaped, 5-lobed, with midpetaline bands hairy outside. **Stamens** included or slightly exserted; filaments glabrous or glandular at base; anthers oblong, cordate, or sagittate at base; pollen smooth. **Ovary** 2-locular, with 2 ovules in each locule; style bifid or 2 free styles, often unequal in length; stigmas 2, globose or peltate, rarely 2-partite. **Capsule** 2–4(8)-valved, 2-locular. **Seeds** 4 or fewer, glabrous or pilose. $x = 15$ (14).

Species ± 40, cosmopolitan in tropics; 1 in sthn Afr.: *Bonamia velutina* Verdc., Botswana, Northern Province, KwaZulu-Natal.

Calystegia R.Br. 6994000

Brown: 483 (1810) name conserved; Meeuse: 696 (1957); Meeuse & Welman: 49 (2000).

Volvulus Medik.: 42 (1791). *Convolvulus* L. in part, Salter: 685 (1950).

Characters generally as in **Convolvulus**, but bracteoles large and clasping calyx. **Corolla** medium-sized to large, white or pink. **Pollen** smooth. **Ovary** 1-locular or imperfectly 2-locular, 4-ovuled; stigmas 2, oblong or elliptic, compressed. **Seeds** black, smooth or verrucose. $x = 11$ (12).

Species ± 25, in temperate and tropical regions of both hemispheres; 2 in sthn Afr., rare and local on the Western Cape coast, 1 introduced.

Convolvulus L. 6993000

Linnaeus: 153 (1753); Meeuse: 666 (1957); Meeuse & Welman: 35 (2000).

Herbs, spreading, erect or twining, sometimes with woody rootstock. **Leaves** sessile or petiolate, often cordate or hastate, entire to variously incised. **Flowers** pedunculate, axillary, solitary or in few-flowered cymes, with a pair of short bracts on upper portion of peduncle. **Calyx** of 5 sepals, usually subequal. **Corolla** ± funnel-shaped to campanulate; limb plicate, 5-angled to obscurely 5-lobed. **Stamens** 5, arising near base of corolla, included; filaments linear, often dilated at base; anthers oblong, sagittate or cordate at base; pollen smooth. **Disc** annular. **Ovary** 2-locular, with 2 ovules in each locule; style included; stigmas 2, linear-terete, subclavate, slightly dilated or filiform. **Fruit** a globose capsule, dehiscing irregularly, or into 4 valves. **Seeds** rounded on back, flat on two lateral faces, or irregularly angled, glabrous, sometimes shortly tuberculate or with transverse ridges. $x = 15$ (11, 12) (aneuploids, polyploidy).

Species ± 250, cosmopolitan, mainly temperate and subtropical regions; 14 in sthn Afr., widespread in both summer- and winter-rainfall areas, 1 introduced.

Cuscuta L. 6968000

Linnaeus: 124 (1753); Yuncker: 113 (1932); Meeuse: 644 (1957); Meeuse & Welman: 3 (2000).

Parasitic, usually glabrous, slender, twining, yellowish annuals. **Leaves** rudimentary. **Flowers** clustered, whitish or rose-coloured. **Calyx** with shortly campanulate tube, (4)5-lobed or -segmented. **Corolla** with campanulate, urceolate, ovoid, or globose tube, with membranous, fimbriated or toothed scales within, alternating with lobes; lobes (4)5, as long as or shorter than tube. **Stamens** arising in corolla throat; filaments subterete, rarely absent; anthers elliptic; pollen smooth. **Ovary** subglobose, completely or partly 2-locular, with 2 ovules in each locule; styles 2, free or connate at base; stigmas clavate, cylindric or capitate. **Fruit** a globose or ovoid, dry or fleshy capsule, circumscissile or irregularly dehiscent. **Seeds** somewhat convex on one side and flattish on other. $x = 7$ (15, 8) (aneuploids, polyploidy).

Species ± 140, cosmopolitan in warmer regions; 15 in sthn Afr., widespread in all regions except arid areas, including 3 introductions.

***Dichondra** J.R.Forst. & G.Forst. 6971000

Forster & Forster: 20 (1776); Meeuse: 657 (1957); Meeuse & Welman: 16 (2000).

Small, prostrate, glabrous or silky-pubescent herbs. **Leaves** cordate-orbicular or reniform, petiolate, entire. **Flowers** small, solitary, axillary. **Calyx** 5-segmented. **Corolla** with broadly campanulate tube; lobes 5, induplicate. **Stamens** shorter than corolla; anthers oblong to subglobose; pollen smooth. **Ovary** deeply 2-lobed, 2-locular, with 2 ovules in each locule, hairy; styles 2, free or connate below, attached between lobes of ovary; stigmas capitate. **Fruit** of 2 membranous capsules, indehiscent or irregularly 2-valved. **Seeds** 1(2) in each locule, subglobose or obovoid. $x = 15$ (12—1 report).

Species 4 or 5, principally American, with 1 species introduced in the tropical and subtropical regions of both hemispheres: **Dichondra micrantha* Urb., Northern Province, North-West, Gauteng, KwaZulu-Natal, Western and Eastern Cape.

Evolvulus L. 6973000

Linnaeus: 391 (1762); Verdcourt: 16 (1963); Meeuse & Welman: 22 (2000).

Volvulopsis Roberty: 28 (1952).

Spreading annual or perennial herbs, rarely suffrutices. **Leaves** usually small, often sessile, entire. **Flowers** solitary and sessile, or 1–3 on axillary peduncles, or sometimes in terminal spikes, racemes or panicles. **Calyx** 5-lobed. **Corolla** funnel-shaped, campanulate, or subrotate; limb plicate, shortly 5-lobed. **Stamens** arising usually above middle of corolla tube; filaments and anthers linear. **Ovary** (1)2-locular, with 2 ovules in each locule; styles 2, free, each bifid or bilobed; stigmas linear-terete or subclavate. **Fruit** a subglobose capsule dehiscing into 2–4 valves. **Seeds** 4 or fewer by abortion, globose. $x = 13$ (12).

Species ± 100, mainly tropical America; 2 in sthn Afr., all regions except Free State, Lesotho, Western and Eastern Cape; 1 introduced.

Falkia Thunb. 6972000

Thunberg: 17 (1781), name and spelling conserved; Meeuse: 658 (1957); Meeuse & Welman: 19 (2000).

Slender, prostrate, matted, perennial herbs. **Leaves** ovate or cordate, entire, petiolate. **Flowers** small, solitary, axillary. **Calyx** deeply 5(6)-lobed or -segmented. **Corolla** with funnel-shaped or campanulate tube; limb plicate, shortly and broadly 5-lobed. **Stamens** arising on corolla tube, included; filaments linear; anthers oblong; pollen smooth. **Ovary** deeply 4(5)-lobed, with 1 ovule in each locule, hairy; styles 2(3), gynobasic, nearly as long as corolla tube, linear; stigmas subglobose. **Fruit** split into

4(5) membranous utricles, sometimes fewer by abortion. **Seeds** obovoid or subglobose.

Species 2 or 3, Africa; 2 in sthn Afr., all regions except Swaziland and Lesotho.

Hewittia Wight & Arn. 6995000

Wight & Arnott: 22 (1837); Meeuse: 698 (1957); Meeuse & Welman: 52 (2000).

Shutereia Choisy: 485 (1833). *Eremosperma* Chiov.: 143 (1936).

Twining herb, pubescent. **Leaves** petiolate, broadly cordate, entire, angled, or 3-lobed. **Flowers** axillary, long-peduncled, 1–3 together; bracteoles at some distance from calyx. **Calyx** of 5 sepals with 2 outer larger than others. **Corolla** funnel-shaped or campanulate; limb plicate, 5-angled or obscurely 5-lobed. **Stamens** arising at base of corolla tube; included; filaments linear, dilated and with few hairs at base; anthers oblong-linear, lobed at base. **Disc** shortly cup-shaped. **Ovary** imperfectly 1-locular, with 4 ovules, densely pilose; style simple, included; stigmas 2, ovate-oblong, thick. **Fruit** a capsule, dehiscing into 4 valves. **Seeds** black, glabrous, opaque. $x = 15$.

Species 1, tropics and subtropics of Old World: *Hewittia malabarica* (L.) Suresh, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Eastern Cape.

Ipomoea L. 7003000

Linnaeus: 159 (1753); Meeuse: 711 (1957); Verdcourt: 81 (1963); Meeuse & Welman: 70 (2000).

Pharbitis Choisy: 438 (1833). *Calonyction* Choisy: 441 (1833). *Rivea* Choisy: 325 (1845). *Turbina* in sense of A.Meeuse: 773 (1957).

Erect or twining, annual or perennial herbs, or undershrubs, sometimes tuberous, rarely aquatic. **Leaves** entire, lobed or divided. **Flowers** usually showy, solitary or in cymose clusters. **Calyx** of 5 variable sepals. **Corolla** broadly funnel-shaped or campanulate; limb 5-plicate and shortly 5-lobed. **Stamens** arising towards base of corolla tube, included; filaments sometimes dilated and often pilose at base; pollen spinulose. **Disc** entire or undulate. **Ovary** usually 2-locular, with 2 ovules in each locule, or 4-locular with 1 ovule in each locule, rarely 3-locular with 2 ovules in each locule; style simple; stigma subglobose or 2- or 3-globular. **Fruit** a globose, rarely ovoid capsule, membranous, leathery or rarely somewhat fleshy, dehiscing into (2)4 valves, rarely opening by an operculum or dehiscing irregularly, also indehiscent (*Turbina* in sense of A.Meeuse). **Seeds** 4(6) or fewer by abortion, glabrous to silky-villous. $x = 15$ (14) (aneuploids, B-chromosomes—1 report, polyploidy).

Species ± 500, cosmopolitan in tropical and subtropical areas; 56 in sthn Afr., widespread in all regions, but rare in Northern and Western Cape.

Jacquemontia Choisy 6991000

Choisy: 476 (1833); Meeuse: 699 (1957); Meeuse & Welman: 32 (2000).

Thyella Raf.: 84 (1836).

Twining herbs, sometimes annual. **Leaves** ovate, sometimes cordate, petiolate, usually entire. **Flowers** in axillary, pedunculate cymes or heads; bracteoles various. **Calyx** of 5 leafy sepals; sepals equal or outer longer than inner. **Corolla** united, campanulate or funnel-shaped, limb plicate, shallowly 5-lobed. **Stamens** arising near base of corolla tube, included; filaments linear; anthers oblong. **Ovary** 2-locular, with 2 ovules in each locule; style simple, included. **Stigmas** 2, ovate or oblong. **Fruit** a globose capsule, dehiscing into 4(8) valves. **Seeds** rounded on back with 2 flat lateral faces and ± 3-angled in cross section, glabrous. $x = 9$ (10).

Species ± 120, mainly America, a few in tropical Africa, Asia and Australia; 1 in sthn Afr.: *Jacquemontia tamnifolia* (L.) Griseb., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal.

Merremia Dennst. ex Endl. 6997000

Endlicher: 1403 (1841); Hallier: 581 (1893b); Meeuse: 700 (1957); Meeuse & Welman: 55 (2000).

Perennial herbs, prostrate or sometimes twining. **Leaves** sessile or petiolate, entire or palmately or pinnately lobed. **Flowers** axillary, solitary or in variously branched or cymose inflorescences. **Calyx** of 5 equal sepals, sometimes accrescent. **Corolla** funnel-shaped or campanulate; usually obscurely 5-lobed. **Stamens** arising nearly at base of corolla tube, included; filaments linear, often unequal, slightly broadening below; anthers oblong, lobed at base, or sometimes contorted. **Disc** saucer-shaped. **Ovary** 2(4)-locular, with 2(1) ovules in each locule; style included; stigma biglobose or somewhat 2-lobed. **Fruit** a membranous, 4-valved capsule. **Seeds** somewhat flattened, elliptic or subquadrate in outline, sometimes somewhat tubercled. $x = 15$ (14) (aneuploids).

Species ± 80, cosmopolitan in warm regions; 9 in sthn Afr., widespread in all regions but absent from Western Cape.

Paralepistemon Lejoly & Lisowski 7003020

Lejoly & Lisowski: 196 (1986); Gonçalves: 127 (1987); Meeuse & Welman: 121 (2000).

Ipomoea L. in small part: 159 (1753). *Turbina* Raf. in small part: 81 (1836).

This genus differs from *Ipomoea* as follows: **Stamens** arising on triangular, large (2 mm long) glandular-pilose scales situated near base of corolla tube. **Ovary** with a very short beak persistent in fruit. **Style** articulated at base, caducous. **Fruit** indehiscent, ± woody.

Species 1: *Paralepistemon shirensis* (Oliv.) Lejoly & Lisowski, central and southern tropical and subtropical Africa, reaching Northern Province.

Seddera Hochst. 6978000

Hochstetter: 7, t. 5 (1844); Meeuse: 662 (1957); Meeuse & Welman: 25 (2000).

Breweria R.Br.: 487 (1810) in part.

Shrublets or suffrutices, prostrate to suberect. **Leaves** sessile or subsessile, entire. **Flowers** sometimes solitary or in axillary cymes or terminal, thyrsoid panicles; bracteoles usually small. **Calyx** with 5 subequal or unequal segments. **Corolla** funnel-shaped or rotate, sometimes plicate, shortly 5-lobed. **Stamens** (4)5, arising on corolla tube; filaments usually dilated at base and toothed on each side; anthers oblong. **Disc** small or rudimentary. **Ovary** 2-locular, with 2 ovules in each locule; styles 2(3), almost as long as corolla, somewhat connate or free; stigmas capitate, peltate, bifid, or bilobed. **Fruit** a capsule, dehiscing into 4 valves. **Seeds** irregularly concave-convex.

Species ± 20, mainly Africa, also Madagascar, Arabian Peninsula and India; 3 in sthn Afr., present in all regions except Western Cape.

Stictocardia Hallier f. 7010000

Hallier: 159 (1893a); Verdcourt: 68 (1963); Meeuse & Welman: 124 (2000).

Herbaceous or woody, perennial twiners. **Leaves** entire, ovate to orbicular, cordate, usually large, minutely

gland-dotted on lower surface. **Flowers** axillary, pedunculate, solitary or in few- to many-flowered cymes; bracts small, deciduous. **Calyx** 5-parted; sepals elliptic to orbicular, accrescent in fruit. **Corolla** large, funnel-shaped with shallowly lobed limb. **Stamens** arising near base of corolla tube; pollen globose, spinulose. **Disc** annular, entire or somewhat 5-lobed. **Ovary** 4-locular, with 1 ovule in each locule; style filiform; stigma bi-globular. **Fruit** enclosed in accrescent calyx, globose, winged, woody; walls between wings thin, rupturing irregularly and fruit becoming lantern-shaped. **Seeds** dark brown or black, pubescent.

Species ± 12, throughout the Old and New World tropics; 1 in sthn Afr.: *Stictocardia laxiflora* (Baker) Hallier f., KwaZulu-Natal.

Xenostegia D.F.Austin & Staples 6997010

Austin & Staples: 533 (1980); Meeuse & Welman: 63 (2000).

Merrenia Dennst. ex Hallier f. in part: 581 (1893b).

Prostrate or climbing herbs. **Leaves** shortly petiolate, mostly glabrous, linear to lanceolate-elliptic or spathulate; truncate or hastate-sagittate at base; basal lobes of blade dentate or entire; apex acute or obtuse to truncate or emarginate, mucronate or tridentate. **Inflorescence** cymose, 1–3-flowered. **Calyx** subequal or 2 outer sepals larger, oblong to oblong-ovate, acute to subobtuse, occasionally sagittate at base; inner sepals usually lanceolate or lanceolate-acuminate. **Corolla** broadly funnel-shaped to campanulate; pale yellow to sometimes white, often with purple to brown centre. **Anthers** straight at anthesis; pollen grains pantoporate, smooth. **Fruit** ovoid, 4-valved, glabrous or pubescent towards apex. **Seeds** 1–4, ovoid-trigonous, brown or black, obtuse at apex.

Species 2, Old World tropics; 1 species with 1 subspecies: *Xenostegia tridentata* (L.) D.F.Austin & G.W.Staples subsp. *angustifolia* (Jacq.) A.Meeuse, widespread in sthn Afr. but absent from Lesotho, Western and Eastern Cape.

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Cornaceae

(Asteridae—Cornales)

Compiled by R.H. Archer

Small trees or shrubs; young growth densely greyish- or brownish-tomentose. **Leaves** opposite, leathery, simple, coarsely toothed, prominently veined on lower surface, shiny dark green above; stipules 0. **Flowers** bisexual, regular, arranged in panicles. **Calyx**: lobes 4, triangular-ovate, persistent; tube ± 4-angled, twice as long as lobes. **Petals** 4, free, valvate. **Stamens** 4, alternating with petals and ± as long; anthers 2-thecous, dehiscing laterally. **Disc** tumid, 4-angled, pubescent. **Ovary** inferior, 4-locular; 1 anatropous, pendulous, unitegmic ovule in each locule; placentation usually axile; style 1, shorter than stamens; stigma 4-lobed. **Fruit** a small, ± globose drupe crowned by calyx lobes, reticulately veined. **Seeds** 1 per locule; endosperm copious; embryo small. $x = 13$ (1 report).

Genera ± 10, species ± 90; widely distributed in tropical and temperate regions; sthn Afr.: genus 1, species 1.

Cannon: 635 (1978).

Curtisia Aiton 6156000

Aiton: 162 (1789); Cannon: 635 (1978).

Description as for family.

Monotypic, confined to southern parts of Africa: *Curtisia dentata* (Burm.f.) C.A.Sm., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

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Crassulaceae

(Rosidae—Rosales)

Compiled by L.L. Dreyer & A.M. Makwarela

Herbs, undershrubs or shrubs, sometimes treelets, rarely aquatics, usually succulent. **Leaves** opposite, in whorls or spirally arranged, simple, usually entire or crenate, rarely lobed, often in basal rosettes, often with hydathodes (water-excreting pores); stipules 0. **Flowers** bisexual, regular (except in *Tylecodon grandiflorus*), usually in terminal thyrses, sometimes solitary. **Calyx**: sepals 4 or 5(–12), free or ± united, persistent. **Corolla**: petals 4 or 5(–12), free or ± united, as many as sepals, persistent. **Stamens** 8 or 10(–12), usually twice as many as sepals, at one or two levels; filaments arising from base of petals or on corolla tube; anthers 2-thecous, introrse to lateral, with longitudinal slits. **Squamae** (nectary scales/glands) 1 at base of each carpel. **Carpels** as many as calyx lobes, usually free or almost so, each gradually tapering into a style; ovules few to many on the adaxial suture; stigma simple, usually terminal. **Fruit** usually a head of free follicles often enclosed by dry petals. **Seeds** small; endosperm present.

Genera ± 33, species over 1500, cosmopolitan (excluding Australia and western Pacific), with centres in sthn Afr. and Central America; sthn Afr.: genera 6 (1 exotic), species 234 (1 exotic).

Harvey: 327 (1862); Keay: 114 (1954); Friedrich: 1 (1968); Tölken: 1 (1985).

Key to genera

1a Leaves spirally arranged, often in dense clusters; flowers in a thyrse with monochasia, often single-flowered or spike-like:
  2a Leaves soft, herbaceous, seasonal; inflorescence a single-flowered to branched thyrse ..... **Tylecodon**
  2b Leaves usually tough, perennial; inflorescence a spike-like thyrse, rarely branched ..... **Adromischus**
1b Leaves opposite or in whorls, at least on vegetative branches; inflorescence a thyrse with dichasia ending in monochasia, rarely with a single, terminal or axillary flower (*Cotyledon woodii*):
  3a Leaves opposite, ± fused to one another; stamens as many as calyx lobes ..... **Crassula**
  3b Leaves opposite or spirally arranged, ± free; stamens twice as many as calyx lobes:
    4a Flowers 5-merous ..... **Cotyledon**
    4b Flowers 4-merous:
      5a Flowers erect; filaments fused to corolla tube at or above middle ..... **Kalanchoe**
      5b Flowers pendulous; filaments fused to corolla tube in lower third ..... ***Bryophyllum**

Adromischus Lem. 3175000

Lemaire: 59 (1852); Smith: 613 (1939); Jacobsen: 189 (1966); Friedrich: 1 (1968); Tölken: 382 (1979); Tölken: 37 (1985).

Shrublets, rarely herbs with branches usually decumbent, rarely erect, carnose or sometimes slightly woody. **Leaves** spirally arranged but usually in dense clusters, sessile or petiolate, free, fleshy, persistent. **Inflorescence** usually a spike-like thyrse, rarely branched, with one to many monochasia each with 1(–5) flowers; peduncle present, with distinct bracts abruptly shorter than leaves; flowers erect or spreading (pendulous in *A. phillipsiae*), 5-merous. **Calyx** with 5 triangular, sharply acute lobes. **Corolla** fused into tube, and spreading lobes joined at base by a membrane. **Stamens** 10, in 2 whorls; filaments glabrous or minutely papillose and fused to lower third of corolla tube; anthers protruding or included, with terminal appendages spherical or almost so. **Squamae** 5, free. **Carpels** 5, usually free, gradually tapering into short styles. **Seeds** ellipsoid, with constrictions before abruptly widening at blunt proximal end, covered with vertical ridges and dense horizontal striations in grooves. $x = 9$ (polyploidy).

Species 27, endemic to sthn Afr., widespread.

***Bryophyllum** Salisb. 3165000

Salisbury: t. 3 (1805); Harvey: 380 (1862); Bentham & Hooker: 658 (1865); Britten: 389 (1872); Berger: 408 (1930); Keay: 116 (1954); Tölken: 73 (1985). Sometimes included in *Kalanchoe*.

Shrubs to shrublets with branches erect, cartilaginous, but usually somewhat woody, rarely regenerating from base. **Leaves** opposite, free, fleshy, persistent, usually producing pseudobulbils on margin. **Inflorescence** a thyrse consisting of several dichasia usually ending in monochasia with few flowers; bracts on peduncle distinct, abruptly shorter than leaves; flowers pendulous, 4-merous. **Calyx**: sepals 4, fused more than half their length. **Corolla** fused into tube longer than spreading lobes. **Stamens** 8, in 2 whorls; filaments glabrous, fused to corolla tube in lower third; anthers usually protruding, with terminal appendage spherical or almost so. **Squamae** 4, free. **Carpels** 4, free, with ovary abruptly constricted into long, ± filiform styles. **Seeds** ellipsoid, with a constriction and abruptly widening at blunt proximal end, covered with vertical ridges and dense horizontal striations in grooves between them. $x = 17$ (aneuploids, polyploidy).

Genus possibly originally restricted to Madagascar; 1 in sthn Afr.: **Bryophyllum delagoense* (Eckl. & Zeyh.) Schinz, naturalised in disturbed areas and on roadsides, especially in sheltered frost-free areas of Mpumalanga, but also often seen as a garden escape in and around towns.

Cotyledon L. 3164000

Linnaeus: 429 (1753); Harvey: 370 (1862); Schonland: 130 (1915); Berger: 412 (1930); Friedrich: 5 (1968); Tölken: 377 (1979); Tölken: 3 (1985).

Shrubs or shrublets with branches usually erect, slightly carnose but somewhat woody. **Leaves** opposite or rarely whorled, free, sessile, fleshy, persistent. **Inflorescence** a thyrse with one to several dichasia usually ending in monochasial branches; bracts on peduncle distinct and abruptly shorter than leaves; flowers usually pendulous, 5-merous. **Calyx** 5-partite. **Corolla** with 5 petals fused

into a tube often longer than lobes. **Stamens** 10, in 2 whorls; filaments usually with a tuft of hairs where fused to lower third of corolla tube; anthers exserted, with terminal appendage spherical or almost so. **Squamae** ± fused laterally to opposite carpel to form a cup. **Carpels** sometimes slightly fused at base, with slender styles. **Seeds** ellipsoid, with constriction before abruptly widening at blunt proximal end, covered with vertical ridges and dense horizontal striations in grooves. x = 9 (6, 8, 17) (aneuploids, polyploidy).

Species 9, widespread throughout sthn Afr. extending into eastern tropical Africa, Ethiopia and the SW Arabian Peninsula; 9 in sthn Afr.

Crassula L. 3168000

Linnaeus: 282 (1753); Harvey: 332 (1862); Schonland: 151 (1929); Friedrich: 11 (1968); Tölken: 75 (1985).

Tillaea L.: 128 (1753). *Bulliarda* DC.: 1 (1801); Harvey: 329 (1862). *Rochea* DC.: t. 103 (1802). *Vauanthes* Haw.: 18 (1821). *Grammanthes* DC.: 392 (1828). *Helophytum* Eckl. & Zeyh.: 288 (1836). *Dinacria* Harv.: 330 (1862). *Pagella* Schönl.: 67 (1921). *Rhopalota* N.E.Br.: 7 (1931).

Delicate annual or perennial undershrubs to shrubs, rarely treelets, with cartilaginous to soft-wooded branches, rarely perennating in tubers. **Leaves** opposite, ± connate, membranous to thickly fleshy, persistent or deciduous, rarely regenerating from base. **Inflorescence** a thyrse with 1–many dichasia, rarely reduced to monochasia or a single terminal flower; peduncle present to indistinct, with bracts distinctly shorter to as long as leaves; flowers spreading or stiffly erect, (4)5(–12)-merous. **Corolla** with (4)5(–12) petals, basely shortly fused into a tube (often not visible with the naked eye), free lobes often tubular with ± spreading apices. **Stamens** (4)5(–12), in one whorl; filaments glabrous and ± fused to corolla tube; anthers included or exserted, without terminal appendage. **Squamae** (4)5(–12), free. **Carpels** (4)5(–12), usually free and gradually constricted into style terminating in a single stigma, but stigma sometimes sessile or laterally placed. **Seeds** ellipsoid, smooth to covered with variously shaped tubercles which are often arranged in vertical rows. x = 7, 8 (aneuploids, high polyploidy).

Species over 300, the centre of distribution in sthn Afr., but extending beyond Africa to Europe, America, Australia, New Zealand and southern islands; 150 in sthn Afr., widespread but concentrated especially in semi-arid, winter-rainfall areas.

Kalanchoe Adans. 3166000

Adanson: 248 (1763); Candolle: (1828); Harvey: 378 (1862); Bentham & Hooker: 659 (1865); Britten: 390 (1872); Berger: 402 (1930); Keay: 116 (1954); Friedrich: 37 (1968); Tölken: 61 (1985).

Shrublets to shrubs with branches spreading, fleshy but somewhat woody towards base, often regenerating from base. **Leaves** opposite, free or slightly fused, fleshy, persistent or deciduous, rarely regenerating from base. **Inflorescence** a thyrse consisting of several dichasia usually ending in monochasia with few to many flowers; peduncle present or absent with gradual transition from leaves to shorter bracts below flowers; flowers spreading or stiffly erect, 4-merous. **Calyx** 4-partite. **Corolla** with 4 petals fused into a tube longer than spreading lobes. **Stamens** 8, in 2 whorls; filaments glabrous and medially fused to corolla tube; anthers included, with ± spherical terminal appendage. **Squamae** 4, free. **Carpels** 4, free, with ovary gradually constricted into styles with terminal stigma. **Seeds** ellipsoid, with a constriction and abruptly widening at blunt proximal end, covered with vertical ridges and dense horizontal striations in grooves. x = 17 (aneuploids, high polyploidy).

Species ± 200; tropical Africa, Madagascar, S and SE Asia and N Australia; 13 in sthn Afr., restricted to the summer-rainfall areas excluding most parts of S Namibia and most of the Eastern Cape.

Tylecodon Tölken 3164010

Tölken: 378 (1979); Tölken: 19 (1985).

Shrublets or rarely shrubs to treelets, with branches erect, rarely decumbent, cartilaginous. **Leaves** spirally arranged, free, fleshy, deciduous. **Inflorescence** a thyrse (if spike-like then few-flowered) with 1–many monochasia with 1–many flowers; peduncle present with gradual transition from leaves to much shorter bracts below flowers; flowers spreading, 5-merous. **Calyx** 5-partite. **Corolla** with 5 petals fused into a tube usually longer than lobes. **Stamens** 10, in 2 whorls; filaments usually with a tuft of hairs where fused to lower third of corolla tube; anthers usually exserted, with terminal appendage ± spherical. **Squamae** 5, free. **Carpels** 5, usually free, with distinct styles. **Seeds** ellipsoid with constriction before widening abruptly at blunt proximal end, covered with vertical ridges and dense horizontal striations in grooves.

Species 41, endemic to sthn Afr., Namibia, Northern and Western Cape, with concentration of species in the Northern Cape.

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Cucurbitaceae

(Dilleniidae—Violales)

Compiled by W.G. Welman

Monoecious or dioecious herbs, shrubs or undershrubs, prostrate or scandent, usually variably hairy, rarely spiny, mostly with coiled tendrils, sometimes with tuberous or woody rootstock. **Leaves** alternate, usually palmately veined, often palmately lobed, variable, rarely undeveloped; stipules 0 but stipule-like structures sometimes present. **Flowers** usually unisexual, usually regular, sometimes paniculate, often solitary, usually white or yellow. **Male flowers**: calyx and corolla united below to form a tubular receptacle; calyx lobes 5, usually free; corolla lobes usually 5, free or united at the base, often small and inconspicuous, but in some genera rather large but rarely showy; stamens (1 or 2)3(4 or 5), sometimes with a staminode; filaments free or joined, usually shorter than anthers; anthers free or cohering, 1- or 2-thecous, sometimes varying in one flower; thecae straight, curved, or variously bent; connective sometimes appendaged; pistil rudimentary or absent. **Female flowers**: calyx and corolla as in male flower, occasionally different in size; staminodes present or absent; ovary inferior, more rarely free at apex, usually 3-locular, sometimes 1- or 2- or spuriously 4–6-locular, with intruded parietal placentas, with many, rarely 1 or 2, ovules in each locule; style terminal, simple or divided, sometimes surrounded at base by disc-like structure; stigma various, usually of fleshy lobes. **Fruit** often a berry, fleshy or corky, usually indehiscent, many-seeded. **Seeds** often flattened, smooth or pitted, sometimes hairy; cotyledons conforming to shape of seed, thick or flattened; radicle usually short, conical; endosperm very scanty or 0.

Genera ± 120; species ± 735, cosmopolitan in mostly tropical and subtropical countries; in sthn Afr.: 18 genera, 76 species. Several species cultivated, many of economic importance.

Meeuse: 1 (1962); Jeffrey: 1 (1967); Jeffrey: 414 (1978).

Key to genera

1a Tendrils apically 2-fid; styles 3, free:
- 2a Stamen 1, central, with thecae ring-like; ovary compressed, containing 1 ovule ..... **Cyclantheropsis**
- 2b Stamens 4 or 5 with thecae short, straight; ovary trigonous, containing several ovules ..... **Gerrardanthus**

1b Tendrils simple or proximally 2–4-fid, spine-like or absent; style 1:
- 3a Receptacle tube relatively long in both male and female flowers; fruit terete, ribbed or trigonous; stamens 3, with one 1-thecous and the others 2-thecous:
  - 4a Monoecious, scabrid herbs; flowers small; tendrils simple; petioles usually with sessile, stipuliform, leafy bract at base ..... **Dactyliandra**
  - 4b Monoecious or dioecious herbs, sometimes villous; tendrils unequally bifid or simple, rarely 0:
    - 5a Style long, linear; stigma 3-lobed, dilated; fruit fleshy, few-seeded ..... **Trochomeria**
    - 5b Style thick, fleshy; stigma 3-lobed, fleshy; fruit fleshy, many-seeded ..... **Peponium**
- 3b Receptacle tube short, at least in female flowers, or small and campanulate:
  - 6a Leaves with large stipuliform bracts at bases of petioles ..... **Ctenolepis**
  - 6b Leaves without stipuliform bracts at bases of petioles:
    - 7a Fruit muricate or with distinct protuberances or with soft spines:
      - 8a Fruit ultimately dehiscent, often orange or scarlet; seeds much compressed, marginate, usually appearing as if corroded especially along the margin ..... **Momordica**
      - 8b Fruit indehiscent, rarely orange or scarlet; seeds not appearing as if corroded:
        - 9a Soft spines on fruit bearing several bristles and intermingled with setae; seeds marginate ..... **Oreosyce**
        - 9b Soft spines or warts on fruit not setiferous on the sides and not intermingled with setae but sometimes terminating in a single soft bristle; seeds emarginate (see also *Cucumis*) ..... **Acanthosicyos**
    - 7b Fruit not bearing warts, spines or other protuberances, but sometimes hairy:
      - 10a Fruit circumscissile at the base, scarlet when ripe; seeds tumid ..... **Corallocarpus**
      - 10b Fruit not circumscissile at the base:
        - 11a Leaves twice trifoliolate ..... **Momordica**
        - 11b Leaves not twice trifoliolate:
          - 12a Outer layer of fruit soft, usually easily squashed or, if harder, either fruit under 20 mm in diameter or geocarpic, or ellipsoid-fusiform, rarely longer than 100 mm; seeds ovate or elliptic to subglobose, not subrectangular and not notched on one or both ends:
            - 13a Seeds distinctly compressed, often marginate:
              - 14a Fruit small, globose or ellipsoid to ovoid, smooth or finely foveolate, glabrous, shorter than 35 mm; seeds marginate:
                - 15a Fruit subsessile in axillary clusters ..... **Mukia**
                - 15b Fruit not subsessile in axillary clusters:
                  - 16a Fruit globose ..... **Zehneria**
                  - 16b Fruit ellipsoid to ovoid ..... **Cucumella**
              - 14b Fruit larger, mostly longer than 35 mm, glabrous or hairy, never foveolate:
                - 17a Fruit over 50 mm in diameter, often much larger, not geocarpic, glabrous, never scarlet, globose (in cultivated specimens often very large, oblong, and seeds usually dark-coloured) ..... **Citrullus**
                - 17b Fruit not globose or, if so, seeds whitish or fruit geocarpic or fruit under 50 mm in diameter:

18a Seeds smooth, ± regularly elliptic or ovate in outline (not triangular or produced on one side), white; fruit hairy or glabrous, but not scarlet when ripe ..... **Cucumis**

18b Seeds ± triangular in outline, or ovate-oblong and produced on the one side, white or dark-coloured; fruit scarlet and always quite glabrous when ripe ..... **Coccinia**

13b Seeds not much compressed, not marginate ..... **Kedrostis**

12b Outer layer of large fruit (over 60 mm in diameter, never geocarpic) hard and almost bony (see also *Citrullus*, which has almost invariably dark and rather regularly-shaped ovate, elliptic or oblong seeds); seeds narrowly triangular, notched or emarginate on the one side, or subrectangular, truncate or bidentate at one or both ends ..... **Lagenaria**

Acanthosicyos Welw. ex Hook.f. 8590000

Hooker: 824 (1867); Meeuse: 52 (1962); Launert & Roessler: 5 (1968); Jeffrey: 433 (1978).

Dioecious, much-branched, spiny shrub or scrambler. **Leaves** rudimentary or palmatifid. **Tendrils** spine-like or 0. **Male flowers** axillary, solitary or subfascicled: calyx 5-lobed, tube ± campanulate or obconical, leathery, lobes ovate; corolla 5-lobed, lobes ± quadrate, subtruncate, ribbed, glandular-papillose; stamens 3 or 5, inserted in calyx tube, filaments free, broadly linear, villous, anthers 2-thecous or with one 1-thecous, connective dilated; pistil rudimentary, 2-lobed or 0. **Female flowers** solitary: calyx and corolla as in male, but more leathery; staminodes present; ovary ovoid, with 3–5 placentas and many ovules, tuberculate, stigmas 3–5, capitate, 2-lobed or depressed and saucer-shaped (sometimes all forms in a single flower). **Fruit** subglobose, ± size of a large orange, covered with hard protuberances, many-seeded, indehiscent. **Seeds** elliptic, subcompressed, smooth.

Species 2, Africa; both in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Free State, Northern Cape.

Citrullus Eckl. & Zeyh. 8598000

Ecklon & Zeyher: 279 (1836) name conserved; Meeuse: 54 (1962); Launert & Roessler: 6 (1968).

Colocynthis Mill.: 1 (1754) name rejected.

Monoecious or dioecious, annual or perennial herbs. **Leaves** circular or triangular-ovate, cordate, or deeply 3–5-lobed, with lobes lobulate or cut. **Tendrils** 2–4-fid, rarely undivided or straight and spinescent or none. **Male flowers** solitary, rarely fascicled: calyx 5-lobed; tube saucer-shaped or campanulate; corolla 5-lobed, lobes elliptic, oblong, or ovate-oblong, glandular-hairy or setose outside; stamens 3(4), one anther 1-thecous and others 2-thecous, thecae bent, connective flat and broad, inserted at base of calyx tube; pistil 0 or represented by a small gland. **Female flowers** solitary, rarely fascicled: calyx and corolla as in male; staminodes 3, tongue-shaped or represented by setae; ovary ovoid, pubescent, with 3 placentas and many ovules, style short, columnar, stigmas 3, thick, kidney-shaped, somewhat bilobed. **Fruit** globose or ellipsoid, fleshy or dry, indehiscent, many-seeded; pericarp smooth or tubercled. **Seeds** obovate, somewhat compressed, with woody testa; cotyledons oblong to obovate, radicle subacute. $x = 11$ (12).

Species 4, Africa to Asia; 3 in sthn Afr., all regions, rare in KwaZulu-Natal, Western and Eastern Cape.

Coccinia Wight & Arn. 8628000

Wight & Arnott: 347 (1834); Meeuse: 95 (1962); Jeffrey: 442 (1978).

Cephalandra Eckl. & Zeyh.: 280 (1836).

Dioecious, prostrate or climbing, glabrous or scabrid herbs with (always?) tuberous rootstock. **Leaves** digitately 3–5-lobed, with lobes often toothed, usually cordate. **Tendrils** simple or bifid. **Male flowers** in racemes: calyx short, 5-lobed, tube turbinate or campanulate, glabrous, lobes linear; corolla 5-lobed, tube campanulate, sometimes glandular within, lobes broadly elliptic or ovate, sometimes bluntly apiculate, membranous, sometimes glandular; stamens 3, filaments partly free or connate to form a broad flattened structure, anthers sometimes cohering to form a flattened disc, with one anther 1-thecous and the others 2-thecous, thecae bent; pistil 0. **Female flowers** solitary: calyx and corolla as in male; staminodes 3; ovary ovoid, narrowly elliptic or flattened and linear or oblong, with 3 placentas and many ovules, style columnar, stigmas 3, fleshy or flattened, glandular. **Fruit** a many-seeded berry, cylindric or ellipsoid. **Seeds** much compressed, obliquely obovate to oblong, often tomentose, with crustaceous testa. $x = 12$ (polyploidy).

Species ± 30, Old World, all but 1 confined to Africa; 7 in sthn Afr., all regions.

Corallocarpus Welw. ex Hook.f. 8569000

Hooker: 831 (1867); Meeuse: 38 (1962); Jeffrey: 485 (1975).

Monoecious or rarely dioecious, scandent or prostrate herbs, rarely shrubs, scabrid or subtomentose. **Leaves** entire or ± divided, often subcordate. **Tendrils** simple. **Male flowers** usually in dense or lax, pedunculate racemes: calyx shortly 5-lobed, tube broadly campanulate; corolla 5-partite, with segments ovate-oblong; stamens 5, all 1-thecous, inserted in mouth of tube or paired stamens ± united, appearing as 3 (two double 2-thecous, one single 1-thecous), thecae straight, filaments short, with connective often bifid and dilated or produced at apex; pistil minute. **Female flowers** sessile or shortly pedicelled, solitary or aggregated, rarely racemose: calyx and corolla as in male; staminodes 0 or rudimentary; ovary ovoid, often beaked, 2- or 3-locular, with few ovules, style straight, stigmas (2)3(4)-lobed. **Fruit** circumscissile at base, few-seeded. **Seeds** obovoid, swollen or subglobose; cotyledons obovate, thick, fleshy. $x = 12$ (13, 14—1 report) (polyploidy—1 report).

Species ± 15, Old World tropics, mostly African; 7 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, KwaZulu-Natal, Northern Cape.

Ctenolepis Hook.f. 8564010

Hooker: 832 (1867); Jeffrey: 460 (1978).

Blastania Kotschy & Peyr.: 15 (1867).

Monoecious, scabrid, prostrate, rarely scandent herbs, often turning black on drying. **Leaves** orbicular, deeply cordate, 5–7-lobed or -partite, with a large stipuliform bract at base of petiole. **Tendrils** simple. **Male flowers** in racemes, in same axil as female ones: calyx 5-lobed, with short tube, lobes subulate; corolla rotate, 5-parted, segments ovate; stamens 3, free, filaments short, anthers small, one 1-thecous, others 2-thecous, thecae straight; pistil 0. **Female flowers** solitary, shortly pedicelled, in same axil as male ones: bracts stipule-like, orbicular or oblong, toothed or ciliate; calyx and corolla as in male; staminodes 0; ovary ovoid, with few ovules on 2 or 3 placentas, style columnar, stigmas 2 or 3. **Fruit** small,

subglobose or subquadrate in outline, oblique, 2–few-seeded, indehiscent. **Seeds** ovoid, strongly compressed, boat-shaped or concave above, convex beneath, smooth, with an acute margin.

Species 2, Old World tropics; 1 in sthn Afr.: *Ctenolepis cerasiformis* (Stocks) Hook.f., N Botswana and Mpumalanga.

Cucumella Chiov. 8599010

Chiovenda: 183 (1929); Kirkbride: 161 (1994).

Monoecious or sometimes dioecious, rather small, annual or perennial climbers or trailers. **Leaves** usually ± palmately lobed. **Tendrils** simple. **Flowers** small, yellow. **Male flowers** solitary or, more often, in small fascicles, pedicellate; calyx: receptacle tube campanulate, lobes small; petals united below; stamens 3, two 2-thecous, one 1-thecous, shortly arising from tube, connective shortly produced apically, thecae straight, subparallel, sometimes apically hooked; disc elevated, convex. **Female flowers** solitary, pedicellate: perianth as in male flowers; staminodes, when present, 3; ovary smooth, hairy, ovules many, horizontal; disc surrounding base of style, stigma 3-lobed. **Fruit** rather small, fleshy, hairy, sometimes scabrid, ellipsoid and sometimes beaked, or fusiform, indehiscent. **Seeds** small, ovate or elliptic, compressed, lenticular.

Species 11, mostly Africa, also Asia; 4 in sthn Afr., Namibia, Northern Province, Mpumalanga.

Cucumis L. 8599000

Linnaeus: 1011 (1753); Meeuse: 59 (1962); Kirkbride: 1 (1993).

Monoecious, rarely dioecious, annual or perennial herbs, hispid or scabrid, often with woody rootstock. **Leaves** toothed to variably lobed or dissected, sometimes cordate at base. **Tendrils** simple. **Male flowers** fascicled, rarely solitary: calyx 5-lobed, tube campanulate or turbinate, lobes subulate or long-linear, sometimes setose or 3-lobed; corolla 5-partite, lobes oblong, ovate or obovate-oblong; stamens 3, filaments free, linear-oblong, short, anthers free or cohering, with one anther 1-thecous and others 2-thecous, thecae bent, rarely straight, connective produced at apex into an appendage; pistil rudimentary. **Female flowers** usually solitary, rarely fasciculate: calyx and corolla as in male; staminodes often 3; ovary globose, ovoid, or subcylindric, often tubercled or variously hairy, with 3–5 placentas and many ovules, styles short, surrounded at base by cup-like structure, stigmas 3–5(6). **Fruit** various, fleshy, often indehiscent, many-seeded; pericarp smooth or tubercled, glabrous or hairy. **Seeds** suborbicular, or ovate-oblong or obovate; radicle obtuse or subacute. $x = 12$ (7) (high polyploidy, B-chromosomes).

Species 32, mainly Africa, also Asia, Australia; a few widely cultivated; 14 in sthn Afr., all regions, rare in Western Cape.

Cyclantheropsis Harms 8641000

Harms: 169 (1896); Jeffrey: 497 (1978).

Scandent herbs, stems becoming woody when old, arising from perennial tuberous rootstock. **Leaves** simple, petiolate. **Tendrils** apically 2-fid. **Flowers** small, greenish yellow, dioecious, regular. **Male flowers** in lax, many-flowered, axillary paniculoid fascicles: calyx with receptacle tube very shallow, lobes 5, small; petals 5, free, small; stamens united into a single central column, inserted on basal disc, thecae 2, semicircular, horizontal, apical on short central column, forming a split horizontal ring. **Female flowers** in rather few-flowered axillary fascicles: ovary compressed, 1-locular, styles 3, very short, ovule solitary, pendulous; perianth similar to that of male flower; disc 3-angled, basal. **Fruit** compressed, samaroid, 1-seeded, outline elliptic. **Seed** compressed, outline elliptic, rather large.

Species 3; 2 in Africa, 1 in Madagascar; 1 in sthn Afr.: *Cyclantheropsis parviflora* (Cogn.) Harms, Namibia in Caprivi area.

Dactyliandra (Hook.f.) Hook.f. 8563000

Hooker: 557 (1871a); Meeuse: 10 (1962).

Monoecious, scabrid, scandent or prostrate herbs. **Leaves** 3-partite or 5–7-lobed, petiolate, with stipuliform bract at base of petiole. **Tendrils** simple. **Male flowers** subumbellate, in different axils than female ones: calyx 5-lobed, tube campanulate; corolla shortly campanulate, with ring of globule-tipped hairs in throat, lobes longer than tube, oblong or oblong-elliptic, pubescent or glandular-papillose; stamens 3, inserted near base of corolla tube, filaments somewhat longer than anthers, anthers dissimilar, one 1-thecous and two 2-thecous; pistil rudimentary. **Female flowers** in different axils than male ones: calyx and corolla as in male; staminodes 0; ovary oblong, with 3 placentas, style columnar, arising from disc, stigma subcapitate, 3-lobed. **Fruit** small, globose, with few to many seeds. **Seeds** irregularly oblong, pointed on one side with both surfaces flattish and sinuate on edges; testa thick. $x = 11$ (1 report).

Species 2, Africa and India; 1 in sthn Afr.: *Dactyliandra welwitschii* Hook.f., Namibia.

Gerrardanthus Harv. ex Hook.f. 8555000

Hooker: 840 (1867); Meeuse: 8 (1962).

Dioecious, climbing or scandent plants, with (always ?) tuberous rootstock. **Leaves** ovate, cordate. **Tendrils** 2-fid. **Male flowers** on long pedicels in subumbellate fascicles: calyx small, rotate, 5-lobed; corolla rotate, 5-partite, segments linear-oblong or ovate-oblong, with 2 somewhat larger than others, with margin recurved; stamens 4, connivent in pairs and a staminode, filaments linear, somewhat incurved, ± as long as anthers, fleshy, anthers 1-thecous, slightly curved, sometimes connective tailed; ovary 0, rudimentary style sometimes present. **Female flowers**: calyx and corolla as in male; stamens 0; ovary 3-locular, with pendulous ovules in each locule, styles 3, free, short, conical, stigmas shortly reniform, with sinus uppermost. **Fruit** dry, terete, ribbed, 3-valved at apex. **Seeds** oblong-lanceolate, biconvex, with a membranous wing as long as seed at one end; testa pustulate, somewhat woody; cotyledons oblong, straight; radicle straight.

Species 5, Africa; 2 in sthn Afr., Swaziland, KwaZulu-Natal, Eastern Cape.

Kedrostis Medik. 8568000

Medikus: 69 (1791); Meeuse: 24 (1962); Jeffrey: 484 (1978).

Monoecious, rarely dioecious, scandent or prostrate, perennial herbs, scabrid or glabrous, sometimes subfleshy and with tuberous rootstock. **Leaves** entire to lobed or partite. **Tendrils** simple, rarely bifid. **Male flowers** racemose or subcorymbose: calyx 5-lobed, tube campanulate, pilose within, lobes linear-lanceolate, ovate-oblong or subulate, with few glandular hairs; corolla 5-partite, lobes ovate or oblong-linear, often pubescent or glandular-hairy; stamens 3(4 or 5) arising from receptacle tube, filaments free, ± as long as anthers, when 3 present then 1 anther 1-thecous and 2 anthers 2-thecous, when 5 stamens present then all anthers 1-

thecous, thecae straight or ± curved, connective often produced and often bifid or bipartite; pistil 0, or gland-like. **Female flowers** solitary or clustered, shortly pedicelled: calyx and corolla as in male; staminodes 0–5 often 3; ovary ovoid or elliptic, sometimes beaked, with 2 or 3 placentas and few, rarely many ovules, sometimes hairy, with long, glandular hairs, style columnar, not or only slightly surrounded by disc at base, stigmas 2 or 3, broad or narrow, each stigma often shortly bilobed. **Fruit** a berry, ovoid, often beaked, few- to many-seeded. **Seeds** often globose with a margin and crustaceous, punctate or slightly pustulate or smooth; cotyledons thick, fleshy. $x = 12$, 13 (1 report).

Species ± 25, Old World tropics, mostly Africa; 9 in sthn Afr., all regions.

Lagenaria Ser. 8610000

Seringe: 25, t.2 (1825); Meeuse: 82 (1962); Jeffrey: 437 (1978).

Adenopus Benth.: 372 (1849). *Sphaerosicyos* Hook.f.: 824 (1867).

Monoecious or dioecious, annual or perennial, scandent or prostrate herbs. **Tendrils** bifid, rarely simple. **Leaves** petiolate, palmately lobed, with lobes apiculate and with 2 glands at apex of petiole. **Male flowers** in racemes: calyx 5-lobed, tube subcampanulate, lobes subulate, each with 2 or 3 subglobose swellings at base; corolla 5-lobed, lobes elliptic or oblong, densely papillose on inner face, papillose on outer, villous at base within, veined and with 3 prominent ribs on outer face; stamens 3, filaments oblong-linear, free, 1 anther 1-thecous, others 2-thecous, thecae much folded, connective broad and flat; pistil 0. **Female flowers** solitary: calyx and corolla as in male; staminodes 3, small; ovary ellipsoid, with 3 placentas and many ovules, style cylindric, stigma globose, shortly 3-lobed, fleshy. **Fruit** the size of a large orange, many-seeded, with leathery pericarp. **Seeds** elliptic in outline, with tough, smooth testa; cotyledons elliptic; radicle subacute. $x = 11$ (13—1 report).

Species ± 6, mostly tropical Africa; 2 in sthn Afr., all regions, except Namibia, Free State, Lesotho and Northern Cape.

Momordica L. 8591000

Linnaeus: 1009 (1753); Meeuse: 45 (1962); Jeffrey: 419 (1978).

Raphanocarpus Hook.f.: 67 (1871b). *Raphanistrocarpus* (Baill.) Pax: 25 (1889).

Monoecious, rarely dioecious, scandent or prostrate herbs. **Leaves** entire, lobed or palmately 3–9-foliolate. **Tendrils** simple or bifid. **Male flowers** solitary, corymbose, subumbellate or racemose, often with a conspicuous, barren bract at apex of pedicel: calyx with variably shaped tube and lobes; stamens (2)3(5), filaments free or somewhat cohering, broadly linear, anthers at first cohering, with 1 anther 1-thecous and others 2-thecous, thecae bent, connective bilobed, not produced at apex; pistil 0, rudimentary, or glandular. **Female flowers** solitary: calyx and corolla as in male; staminodes 0 or represented by 3 glands at base of style; ovary oblong or fusiform, with 3 placentas and many ovules, sometimes echinate, style slender, stigmas 3, entire or bifid. **Fruit** fusiform or cylindric, fleshy, indehiscent or 3-valved, sometimes with short protuberances on margins, few- to many-seeded. **Seeds** turgid or flattened, smooth or variously sculptured, with crustaceous testa; cotyledons elliptic. $x = 11$ (7) (aneuploids, polyploidy).

Species ± 40, Old World, mostly tropical Africa; 9 in sthn Afr., all regions, except Lesotho and Western Cape.

Mukia Arn. 8562000

Arnott: 50 (1840); Jeffrey: 475 (1978).

Annual, monoecious, hispid climbers. **Leaves** 3–7-angled or -lobed. **Tendrils** simple. **Flowers** clustered, small, yellow. **Male flowers** fascicled: calyx campanulate, 5-dentate; corolla with 5-parted limbs; stamens 3, inserted at base of corolla, free, anthers extrorse, linear, straight, cohering, terminated by short, conical appendage of connective. **Female flowers** clustered: calyx and corolla as in male flowers; ovary ovoid, setulose, with 2 or 3 placentas, style short, with a fleshy, annular disc at base, stigmas 3, erect. **Fruit** a berry, globose, smooth or echinulate, few-seeded. **Seeds** turgid, oblong-oval, subcompressed, surrounded by a broad or narrow zone. $x = 6$ (1 report).

Species 4, tropics of Old World, 1 in Africa: *Mukia maderaspatana* (L.) M.J.Roem., Mpumalanga, Swaziland, KwaZulu-Natal.

Oreosyce Hook.f. 8560000

Hooker: 548 (1871a); Meeuse: 21 (1962); Jeffrey: 470 (1978).

Hymenosicyos Chiov.: 62 (1911).

Scandent herb, monoecious, usually slender, variably pubescent. **Leaves** petiolate, undivided to palmately 3–5-lobed. **Tendrils** simple. **Flowers** small, yellow, pedicellate. **Male flowers** solitary or fascicled: receptacle cylindric-campanulate, hispid; sepals dentiform or subulate; corolla rotate to campanulate, with oblong segments; stamens 3, subsessile in middle of receptacle, dorsally attached in their middle, anthers slightly cohering or free, linear or oblong, two 2-thecous, third 1-thecous, thecae straight, obtuse, connective narrow, usually toothed at apex; pistil rudimentary, gland-like. **Female flowers** solitary, rarely with male in same axis: calyx and corolla as in male; staminodes 3, sometimes stamens appearing fertile; ovary fusiform, oblong or ellipsoid, setulose, with 3 placentas and numerous horizontal ovules, style columnar, surrounded by disc at base, stigma 3-lobed, lobes usually fringed. **Fruit** relatively small, indehiscent, ellipsoid or ovoid, covered with hairy or bristly protuberances, intermingled with setae, many-seeded. **Seeds** compressed, ovate, marginate.

Probably monotypic, Africa and Madagascar; *Oreosyce africana* Hook.f. in Northern Province.

Peponium Engl. 8612000

Engler: 318 (1897); Meeuse: 91 (1962).

Peponia Naud.: 29 (1866) name illegitimate.

Monoecious or dioecious, prostrate or scandent, often villous herbs. **Leaves** lobed, rarely entire, toothed. **Tendrils** unequally bifid, rarely simple. **Male flowers** solitary or in racemes: calyx 5-lobed, tube gradually widening upwards or subcylindric, sometimes pilose outside and inside, with vibratile hairs, lobes linear, subulate, rarely sublanceolate; corolla 5-lobed, lobes obovate or oblong-elliptic, entire, sometimes glandular-hairy within and without; stamens 3, arising near base of calyx tube, filaments free, sometimes shorter than anthers, anthers cohering, with 1 anther 1-thecous and others 2-thecous, sometimes sagittate at base, thecae bent; pistil rudimentary. **Female flowers** solitary: calyx and corolla as in male; staminodes 0 or 3, linear; ovary oblong or linear-oblong, with 3 placentas and many ovules, sometimes tomentose, style thick, fleshy, linear, stigma 3-lobed, fleshy. **Fruit** ovoid or cylindric, fleshy, many-seeded. **Seeds** obovate, smooth or sometimes tomentose with crustaceous testa. $x = 12$ (1 report).

Species ± 20, Africa, Madagascar, Aldabra and Seychelles; 4 in sthn Afr., Northern Province, North-West, Gauteng, Free State, KwaZulu-Natal, Northern and Eastern Cape.

Trochomeria Hook.f. 8608000

Hooker: 822 (1867); Meeuse: 85 (1962); Jeffrey: 456 (1978).

Heterosicyos Hook.f.: 822 (1867).

Dioecious, rarely monoecious, scandent, prostrate or erect herbs, with thick roots. **Leaves** entire, lobed or partite, sometimes palmately lobed, often with bract at base of petiole. **Tendrils** simple or 0. **Male flowers** solitary, fascicled or in racemes: calyx 5-lobed, tube funnel-shaped or cylindric, often elongate, sometimes pilose within, lobes small, ovate, linear or subulate; corolla 5-lobed, lobes ovate, linear, linear-oblong or linear-lanceolate, sometimes glandular without; stamens 3, arising at middle or near base of calyx tube, filaments free, terete, ± as long as or longer than anthers, sometimes hairy at base, anthers slightly cohering, with one 1-thecous and others 2-thecous, often sparsely glandular; pistil rudimentary. **Female flowers** solitary: calyx and corolla as in male; staminodes 3, setiform or long-linear; ovary ovoid or elliptic or oblong, with 3 placentas and many ovules, style long, linear, stigma 3-lobed, dilated or 2 large, flat lobes, each bilobed to appear 4-lobed. **Fruit** ovoid, subglobose or oblong, fleshy, few-seeded. **Seeds** ellipsoid, sometimes compressed, smooth, with crustaceous testa; cotyledons elliptic. $x = 12$.

Species ± 8, Africa; 4 in sthn Afr., all regions, except Free State, Lesotho and Western Cape.

Zehneria Endl. 8564000

Endlicher: 69 (1833); Jeffrey: 477 (1978).

Herbs, monoecious or dioecious, with tuberous rootstock. **Leaves** lobed. **Tendrils** simple. **Flowers** small, white. **Male flowers** racemose: calyx campanulate or rugulose, 5-dentate; corolla with spreading, 5-parted limb; stamens 3, 2-thecous, inserted at base of corolla, filaments free, filiform-cylindraceous, terminated by a subcordate connective, along each margin of which at back are attached linear, straight, 2-locular, free or cohering anthers. **Female flowers** umbellate or on simple peduncles: calyx and corolla as in male flowers; stigma cup-shaped, somewhat trilobed. **Fruit** a berry, oblong-fusiform, ovate or globose, with a subcoriaceous pericarp, pseudotrilocular or bilocular, few-seeded. **Seeds** compressed. $x = 12$ (1 report).

Species ± 30; Africa to East Indies and Australia; 3 in sthn Afr., all regions, rare in Northern Cape.

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Cunoniaceae

(Rosidae—Rosales)

Compiled by M. Jordaan

Trees or shrubs, evergreen, glabrous. **Leaves** opposite, trifoliolate or imparipinnate, leathery, often glandular, usually with serrate margins; stipules either conspicuous and united in pairs or small, caducous. **Inflorescences** dense, spike-like racemes or axillary panicles. **Flowers** regular, bisexual, small. **Calyx**: sepals 4 or 5, imbricate or valvate, free or sometimes connate at base. **Petals** 4 or 5, free or connate at base, imbricate, entire or toothed or 3-lobed. **Stamens** free, 8 or 10, alternating with petals, inserted on disc; anthers 2-thecous, didymous, with longitudinal slits. **Disc** annular, nectar-secreting. **Ovary** superior, 2-locular; ovules apotropus, 2–many per locule with axile or apical placentation; styles 2, free; stigmas simple. **Fruit** a capsule, crowned by persistent styles. **Seeds** oblong or ovoid, sometimes winged; testa thin; endosperm copious; embryo small.

Genera ± 6, species ± 250, native to the southern hemisphere, with main centres of distribution Oceania and Australasia, but 2 genera in tropical America; sthn Afr.: genera 2, species 2.

Brown: 548 (1814); Candolle: 12 (1830) as Saxifragaceae; Endlicher: 819 (1839) as Saxifragaceae suborder Cunonieae; Harvey: 305 (1862) as Saxifragaceae; Engler: 94 (1891) as Cunoniaceae; Engler: 229 (1928) as Cunoniaceae.

Key to genera

Stipules united into a large spoon-like structure; inflorescences dense, spike-like racemes; petals longer than sepals; ovules many per locule ..... **Cunonia**

Stipules small, free; inflorescences long-pedunculate, axillary panicles; petals shorter than sepals; ovules 2 per locule..... **Platylophus**

Cunonia L. 3275000

Linnaeus: 1025 (1759); Jussieu: 310 (1789); Candolle: 12 (1830); Endlicher: 819 (1839); Harvey: 306 (1862); Engler: 101 (1891); Engler: 250 (1928); Adamson: 440 (1950).

Trees or shrubs. **Leaves** petiolate, imparipinnate; leaflets 2- or 3-jugate, lanceolate, obtuse or sometimes shortly acuminate, with serrate margins; stipules large, oblong, united into a spoon-shaped structure around leaf buds. **Inflorescences** dense, spike-like racemes. **Calyx** 5-lobed, with short, open tube; lobes imbricate, persistent. **Petals** 5, oblong, imbricate. **Stamens** 10, inserted with petals; filaments filiform, much longer than petals. **Disc** adnate to ovary. **Ovary**: ovules many, axile, pendulous in 2 rows; styles 2, terete. **Fruit** a 2-horned, 2-locular, coriaceous capsule, opening by 2 valves. **Seeds** ± ovoid, with narrow, membranous wing. $x = 8$ (1 report, polyploidy).

Species ± 17, discontinuous distribution with 16 in New Caledonia and 1 in sthn Afr.: *Cunonia capensis* L., forests of Western and Eastern Cape to N KwaZulu-Natal.

Platylophus D.Don 3269000

Don: 92 (1830); Endlicher: 818 (1839); Harvey: 307 (1862); Engler: 99 (1891); Engler: 246 (1928).

Small to large trees. **Leaves** petiolate, trifoliolate; leaflets lanceolate, coriaceous, with toothed margin; stipules small, acuminate, free, deciduous. **Inflorescences** long-pedunculate, many-flowered, axillary panicles. **Calyx** 4- or 5-lobed, with short tube adnate to base of ovary; lobes triangular-ovate, persistent. **Petals** 4 or 5, inserted at base of disc, 3-fid or -toothed, shorter than sepals. **Stamens** 8 or 10, inserted on rim of disc. **Disc** thick, saucer-shaped. **Ovary** with 2 collateral ovules below apex of each locule; styles 2, subulate. **Fruit** a turgid capsule, compressed above, with persistent styles. **Seeds** curved.

Monotypic: *Platylophus trifoliatus* D.Don, forests of S Western Cape to Uitenhage in Eastern Cape.

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Dichapetalaceae

(Rosidae—Malpighiales)

Compiled by R.H. Archer

Trees, shrubs, or rhizomatous shrublets; sometimes very poisonous. **Leaves** alternate, simple, entire, petiolate; stipules caducous. **Flowers** bisexual or unisexual, regular or irregular; in corymbose cymes. **Sepals** 5, free or partially connate, imbricate. **Petals** 5, inserted with sepals, free or united with stamens into a tube, often narrow, 2-fid or 2-lobed. **Disc** often of 5 free glands opposite petals, sometimes connate into an entire or lobed cup. **Stamens** 5, alternating with petals, free or united; anthers dehiscing by longitudinal slits. **Ovary** superior, 2- or 3(4)-locular, with 2 apical-axile pendulous ovules in each locule, often hairy; style mostly simple or 2- or 3(4)-fid. **Fruit** a drupe with 1–3(4) one-seeded free pyrenes. **Seeds**: embryo large, straight, oily; endosperm 0 or rarely present.

Genera 3, species ± 160, circumtropical with few in subtropics; sthn Afr.: genera 2, species 3.

Harvey: 450 (1860) under Chailletiaceae; Torre: 319 (1963); Breteler: 1 (1986).

Key to genera

Flowers regular; petals equal; fertile stamens 5; peduncle rarely adnate to petiole ..... **Dichapetalum**

Flowers irregular; petals unequal, 1 or 2 distinctly larger; fertile stamens 2 or 3; peduncle adnate to petiole ..... **Tapura**

Dichapetalum Thouars 4283000

Thouars: 23 (1806); Torre: 319 (1963); Breteler: 1 (1978); Bretcler: 1 (1982); Breteler: 1 (1986).

Chailletia DC.: 153 (1811); Harvey: 450 (1860).

Trees, shrubs, or rhizomatous shrublets. **Leaves** often with glands at base; with 2 caducous stipules. **Flowers** regular, in axillary cymes or corymbs. **Calyx** 5-partite, with very short, campanulate tube; lobes equal or unequal. **Petals** 5, equal, free, inserted on calyx tube, as long as calyx, sometimes clawed, emarginate or 2-lobed. **Disc** of 5 free glands opposite petals or connate into a cup. **Stamens** 5. **Ovary** superior, 2- or 3(4)-locular; styles 1–3, free or connate, and 2- or 3(4)-lobed. **Fruit** a leathery drupe with 1–3 one-seeded free pyrenes. **Seeds** exalbuminous with thin testa. $x = 12$ (polyploidy).

Species 124, 86 in Africa, 38 in neotropics and Asian tropics; 2 in sthn Afr., Namibia, Northern Province, Mpumalanga, Gauteng and KwaZulu-Natal; leaves and seeds of *Dichapetalum cymosum* (Hook.) Engl., Gifblaar, very poisonous as they contain fluoroacetic acid and pyridene alkaloids.

Tapura Aubl. 4285000

Aublet:126, t. 48 (1775); Torre: 328 (1963); Bretelcr: 1 (1986).

Trees or shrubs. **Leaves**: stipules minute, caducous. **Flowers** irregular, in small, axillary, shortly pedunculate glomerules; peduncle adnate to petiole. **Calyx** with 5 unequal lobes. **Petals** 5, adnate at base to stamens to form an unequal, 5-lobed tube, 3 lobes entire, 2 bifid. **Stamens**: 2 or 3 fertile, 2 sterile. **Ovary** sessile, 2- or 3-locular; style filiform, shortly 2- or 3-fid at apex. **Fruit** drupaceous. **Seeds** with or without distinct endosperm. $x = 12$ (1 report, polyploidy).

Species 21, tropical America and Africa; 1 in sthn Afr.: *Tapura fischeri* Engl., KwaZulu-Natal.

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Dipsacaceae

(Asteridae—Dipsacales)

Compiled by W.G. Welman

Annual or perennial herbs or suffrutices, glabrous or variously hairy. **Leaves** opposite or rarely whorled, entire to variably incised; stipules 0. **Flowers** bisexual, irregular, aggregated into heads, surrounded by an involucre, with individual flowers or florets bracteate or in a calyx-like, dry, persistent involucre. **Calyx** with tube often constricted above ovary; limb cup-shaped, disciform, or divided into 5–20 stellately spreading bristles. **Corolla** gamopetalous, 4- or 5-lobed, somewhat 2-lipped, usually pilose on outer surface; tube widening gradually from base, usually pilose within; lobes unequal, imbricate, usually oblong, shorter than tube. **Stamens** 4(5), arising in upper part of corolla tube and alternating with lobes, often exserted; filaments longer than anthers; anthers linear-oblong, versatile, 2-thecous, opening by longitudinal slits. **Ovary** inferior, 1-locular, with a single, pendulous ovule; style filiform or linear, included or exserted; stigma undivided or with groove on one side, globose, disc-like or oblong. **Fruit** a dry cypsela, crowned with enlarged, persistent calyx limb and enclosed in cup-like involucre.

Genera 11, species 350–400, mostly Mediterranean region, spreading through Europe and Africa to Asia; absent from New World; sthn Afr.: 2 genera, ± 25 species.

Sonder: 41 (1865); Heine: 1 (1968); Cannon & Cannon: 77 (1983).

Key to genera

Calyx small, pappus-like; involucral bracts in several rows ..... **Cephalaria**
Calyx of 5 long awns; involucral bracts in 1 or 2 rows ..... **Scabiosa**

Cephalaria Schrad. 8541000

Schrader: 1, 43 (1818) name conserved; Sonder: 41 (1865); Von Szabo: 1 (1940); Napper: 466 (1968).

Annual or perennial herbs, often with woody rootstock. **Leaves** opposite, often radical, variable in shape and lobing. **Flowers** aggregated into pedunculate heads, rarely heads sessile; individual flowers or florets bracteate or surrounded by an involucre which is often ciliate. **Calyx** small, shallowly lobed, usually ciliate, pappus-like. **Corolla** 4(5)-lobed; tube funnel-shaped, hairy within; lobes often unequal, shorter than tube. **Stamens** 4(5), arising in corolla throat, exserted; filaments linear, longer than anthers; anthers linear or oblong. **Ovary** usually ribbed; style included or exserted; stigma linear, thickened, grooved, or unequally 2-lobed. **Fruit** as for family. $x = 9$ (5, 8) (B-chromosomes).

Species ± 60, Mediterranean and Africa; ± 15 in sthn Afr., all regions except Namibia, Botswana, and Northern Cape.

Scabiosa L. 8546000

Linnaeus: 98 (1753); Sonder: 43 (1865); Heine: 1 (1968); Cannon & Cannon: 81 (1983).

Annual or perennial herbs, sometimes robust, often with woody rootstock, rarely somewhat suffruticose, usually hairy. **Leaves** opposite, often radical, simple to variably cut or dissected. **Flowers** aggregated into pedunculate, rarely sessile, heads; individual flowers or florets subtended by a bract or involucre which is ribbed and expanded into a saucer-shaped, membranous structure. **Calyx** of 5 awns almost as long as corolla. **Corolla** subbilabiate, pilose, 4- or 5-lobed; tube narrowly funnel-shaped, pilose within; lobes oblong, shorter than tube. **Stamens** 4, inserted in upper part of corolla tube, exserted; filaments linear, longer than anthers; anthers linear-oblong. **Ovary**: style linear, shortly exserted; stigma subcapitate, grooved, rarely shortly 2-lobed. **Fruit** as for family. $x = 8, 9$ (aneuploids, B-chromosomes).

Species ± 100, Europe, Africa and to Asia; 9 in sthn Afr., all regions.

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Droseraceae

(Dilleniidae—Nepenthales)

Compiled by L.L. Dreyer & M. Jordaan

Herbaceous, insectivorous, glanduliferous annuals or perennials or floating aquatics (*Aldrovanda*). **Roots** well developed or usually true roots suppressed, parts of stem becoming rhizoids (absent in *Aldrovanda*). **Stems** aerial, rhizomatous, tuberous or suppressed. **Leaves** basal, rosulate and/or caulescent and alternate (verticillate in *Aldrovanda*), with irritable gland-tipped hairs (*Drosera*) or an active trap (*Aldrovanda*); venation folded or circinnate; lamina simple or differentiated (*Aldrovanda*), covered with glandular excrescences such as tentacles, sensitive bristles, stipitate and sensitive glands; stipules intra-axillary, well developed, reduced or 0. **Inflorescence** axillary or terminal, often scapose cymose, sometimes reduced to 1 or 2 flowers. **Flowers** bisexual, usually regular, hypogynous. **Calyx** with 5 lobes connate at base, imbricate, persistent. **Petals** 5, free, sometimes cohering at first, imbricate, marcescent. **Stamens** 5; filaments free; anthers opening by longitudinal slits, extrorse; pollen forming tetrads. **Ovary** superior, 1-locular, of 3–5 carpels; ovules many (rarely few), anatropous; on parietal placentas; styles 3–5, usually free, rarely connate, simple or variously divided; stigma apical. **Fruit** a loculicidal capsule, enclosed in persistent calyx, usually thin-walled, dehiscing in 3–5 sections or rarely irregularly. **Seeds** 3–many, fusiform; embryo short, straight; endosperm copious, rich in starch, oil and protein.

Genera 4, 3 genera monotypic, species ± 100, cosmopolitan; sthn Afr.: genera 2, species 21.

Sonder: 75 (1860); Drude: 261 (1891); Diels: 56 (1906); Phillips: 358 (1951); Obermeyer: 187 (1970); Laundon: 62 (1978); Laundon & Basto: 6 (1993); Mabberley: 242 (1997).

Key to genera

Free-floating aquatic, without roots; leaf lamina articulate ..... **Aldrovanda**
Terrestrial plants, rooting at base; leaf lamina not articulate ..... **Drosera**

Aldrovanda L. 3134000

Linnaeus: 281 (1753); Linnaeus: 136 (1754); Drude: 269 (1891); Diels: 56 (1906); Phillips: 359 (1951); Obermeyer: 187 (1970); Laundon: 62 (1978); Laundon & Basto: 6 (1993).

Floating, rootless herbs. **Stems** unbranched, horizontal, transparent, just submerged, occasionally branching pseudo-dichotomously, new parts developing apically with older leaf whorls dying off successively; forming turions in winter. **Leaves** 6–9 in verticils, connate at base, petiolar part broad, hollow, turgid, apically forming 4–6 subulate, ciliate segments; lamina reniform-rounded, articulate, with long sensitive bristles inside near midrib, causing lobes to close tightly when irritated; sessile, digestive glands present. **Flowers** axillary, solitary, emergent; peduncle robust, reflexed in fruit. **Calyx**: lobes imbricate, ovate-elliptic. **Petals** cohering at first to form cap, white, obovate. **Stamens** 5; filaments subulate; anthers didymous. **Ovary** sessile, subglobose; placentas 5; styles 5, filiform, patent, incurved above; stigmatic apex dilated, much divided, penicillate. **Capsule** subglobose, membranous, 5-valved, ripening below water surface. **Seeds** 6–8, shortly ovoid, black, crustaceous and shiny. $x = 12$ (polyploidy).

Species 1, widespread in Europe, Asia, Australia and scattered localities in tropical Africa; 1 in sthn Afr.: *Aldrovanda vesiculosa* L., Botswana.

Drosera L. 3136000

Linnaeus: 281 (1753); Linnaeus: 136 (1754); Sonder: 75 (1860); Hooker: 661 (1865); Drude: 270 (1891); Diels: 61 (1906); Phillips: 359 (1951); Laundon: 1 (1959); Roessler: 45 (1966); Obermeyer: 189 (1970); Laundon: 64 (1978); Cheek: 738 (1987); Bennett & Cheek: 375 (1990); Laundon & Basto: 6 (1993).

Herbaceous, insectivorous, glanduliferous annuals or deciduous perennials; few, axillary, positively geotropic shoots or pseudo-roots are formed from stem, becoming swollen with reserve foods and densely covered (except tip) with long 'root hairs'; true roots absent (suppressed during germination). **Stems** aerial, rhizomatous or suppressed, annual or perennial (apical tissue persisting as a turion). **Leaves** basal and rosulate and/or caulescent and alternate; lamina simple, bearing various types of glandular hairs; vernation folded (viz. apical part of petiole reflexed so that upper face of lamina touches petiole) or circinnate with blade rolled inwards; petioles often persistent and reflexed or confluent with lamina; stipules well developed, reduced or 0, membranous, often laciniate. **Inflorescence** scapose, axillary or terminal (at least primarily), cymose, helicoid or dichasial, often reduced to 1 or 2 flowers; cyme nodding beyond open flower (viz. buds situated below open flower). **Flowers** usually opening one at a time in bright sunlight, sometimes for a few hours only; pollination often autogamous, seldom cleistogamous. **Calyx**: lobes ovate, occasionally slightly dentate. **Petals** usually obovate or spathulate, sometimes unguiculate, white, pink, purple, yellow or red, sometimes with a dark base, marcescent and coalescing to form a cap over capsule. **Stamens** 5, upper part of filament and connective often swollen dorsally, rhomboidal, causing locules to diverge below. **Ovary** with 3 placentas; styles 3, free, simple or often forked from base, sometimes bifurcate or multifid at stigmatic apex. **Capsule** loculicidally 3-valved, enclosed in persistent calyx. **Seeds** black, ovoid or fusiform, with outer integument extended on both sides; testa smooth, reticulate or warty. $x = 10$ (aneuploids, polyploidy).

Species ± 80, cosmopolitan with a concentration in the southern hemisphere; 20 in sthn Afr., widespread.

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Ebenaceae

(Dilleniidae—Theales)

Compiled by C.L. Bredenkamp

Trees, shrubs, undershrubs, rarely scandent, usually dioecious. **Leaves** alternate, occasionally opposite or whorled, simple, entire, coriaceous; stipules 0. **Flowers** regular, usually unisexual, sometimes bisexual, 3–8-merous, in axillary cymes, racemes, panicles, or solitary; bracts usually present. **Calyx** usually divided almost to base, occasionally with distinct, truncate or shortly toothed tube, persistent and often accrescent in fruit. **Corolla** usually with a short tube and lobes contorted in bud, deciduous. **Stamens** 3 or more in 1 or 2 whorls, arising from base of corolla or on tube, sometimes hypogynous; filaments free or connate at base, in pairs or groups, shorter than basifixed anthers. **Ovary** superior, on a glabrous or fringed disc, 2–16-locular, with axile placentation and 1 or 2 pendulous ovules in each locule; styles 1–3, simple or with 2–5 branches. **Fruit** a berry, with 1–several seeds, becoming dry and occasionally dehiscing slowly. **Seeds** globose or ellipsoid; embryo straight; endosperm usually copious and bony.

Genera 2, species ± 500, throughout tropics and subtropics of both hemispheres, most species in the Indo-Pacific region but centre of variation in Africa (including Madagascar); represented in Africa in most terrestrial vegetation types below 2000 m except in the driest areas; sthn Afr.: genera 2, species 37.

Hiern: 444 (1906); De Winter: 54 (1963); De Winter *et al.*: 107 (1967); White: 248 (1983).

Key to genera

Calyx not accrescent; ovary on a fringed disc; fruit usually 1-seeded; leaves alternate, subopposite, opposite or whorled..... **Euclea**
Calyx usually accrescent; ovary on a glabrous disc; fruit usually with 2 or more seeds; leaves alternate..... **Diospyros**

Diospyros L. 6406000

Linnaeus: 1057 (1753); Hiern: 476 (1906); De Winter: 54 (1963); White: 251 (1983).

Royena L.: 397 (1753); Hiern: 445 (1906).

Trees, shrubs or undershrubs, rarely scandent, usually dioecious. **Leaves** usually alternate, simple, chartaceous to coriaceous. **Flowers** in axillary, subsessile clusters, cymes, pseudoracemes, or solitary, unisexual or falsely bisexual and functionally male. **Calyx** (4)5(–7)-lobed, persistent and mostly accrescent, deeply lobed or bladder-shaped and toothed on mouth. **Corolla** urceolate, 3–5-lobed. **Stamens** 3–15, in a single or double whorl. **Ovary** on somewhat fleshy disc, 2–16-locular, with 1 or 2 pendulous ovules in each locule. **Fruit** a berry with several seeds, rarely only 1, becoming dry and dehiscing slowly. **Seeds** usually elongate, encircled by a single, thin, ± straight line; endosperm bony or flinty, occasionally ruminate. $x = 15$ (high polyploidy, B-chromosomes).

Species ± 475, cosmopolitan in tropical, subtropical and temperate areas (America ± 80, Africa ± 94, Madagascar ± 100, Asia ± 200); in sthn Afr. ± 20 species and several subspecies, Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

Euclea Murray 6404000

Murray: 747 (1774); Hiern: 460 (1906); De Winter: 80 (1963); White: 289 (1983); Retief: 228 (1986).

Trees, shrubs or undershrubs, dioecious. **Leaves** alternate, subopposite or subverticillate, simple, coriaceous. **Flowers** in axillary racemes, pseudoracemes, pseudocymes, panicles, or solitary. **Calyx** 4- or 5-lobed, persistent. **Corolla** urceolate to subglobose and shallowly 5–8-lobed on mouth or campanulate and deeply 4- or 5-lobed. **Stamens** 10–30, free or filaments joined at base in pairs or groups; filaments shorter than anthers; anthers dehiscing by lateral, longitudinal slits; staminodes present or absent in female flowers. **Ovary** on a fimbriate, somewhat fleshy disc, 2–6-locular, with a single, pendulous ovule in each locule, or locules incompletely septate and then with 2 ovules; styles 1 or 2(3). **Fruit** a berry, 1(2 or 3)-seeded. **Seeds** usually globose or, if 2 or 3 together, then hemispherical or 3-angled, marked into 3 areas by a curved groove as in a tennis ball; endosperm usually flinty. $x = 15$.

Species ± 20, Africa; 16 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

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Elatinaceae

(Dilleniidae—Guttiferales)

Compiled by C.L. Bredenkamp

Annual herbs or low shrublets, usually of moist places, with branches either deciduous from a persistent woody crown, or perennial, often creeping and rooting; often aromatic. **Leaves** decussate (rarely verticillate), simple, sessile or subsessile, serrate or rarely entire; stipules paired, interpetiolar, small, deciduous or persistent. **Flowers** bisexual, regular, small, axillary, pedicellate or subsessile, persistent, solitary or in dichasia; bracts resembling reduced stipules or 0. **Sepals** 2–5, free or fused at base, imbricate with outermost somewhat longer than others. **Petals** 3–5, free, imbricate, shorter or longer than sepals. **Stamens** as many as petals or twice as many; filaments of outer whorl alternating with petals and often expanded below, those of inner whorl shorter, sometimes slightly expanded; anthers 2-thecous, opening by longitudinal slits, introrse, versatile, dorsifixed. **Ovary** superior, 3–5-locular; placenta axile; styles 3–5, free with apical, usually swollen stigmas; ovules many, attached to a convex placenta with axis protruding and subulate above. **Fruit** a septicidal capsule. **Seeds** subcylindrical, obtuse, straight or somewhat reniform to horseshoe-shaped, smooth or reticulate; endosperm 0.

Genera 2, species ± 30, cosmopolitan, inhabiting damp areas such as marshes, riverbanks or temporary pools; sthn Afr.: genera 2, species 11.

Linnaeus: 367 (1753); Linnaeus: 172 (1754); Linnaeus: 1309 (1771); Harvey: 115 (1860); Wild: 373 (1961); Friedrich-Holzhammer: 1 (1968); Obermeyer: 23 (1976).

Key to genera

Flowers 5-merous; sepals with a prominent, firm midrib and membranous margin; ovary ovoid or globose, attenuate into short or long styles; herbs or shrublets ..... **Bergia**

Flowers 3-(rarely 2-)merous; sepals without a prominent midrib, texture homogeneous; ovary depressed-globose with minute styles; small, creeping, soft herbs, usually hygrophytic ..... **Elatine**

Bergia L. 5230000

Linnaeus: 1309 (1771); Harvey: 115 (1860); Friedrich-Holzhammer: 1 (1968); Obermeyer: 24 (1976).

Erect shrublets or with annual, repent, decumbent or ascending branches from a woody crown, or annuals, glabrous, pilose or glandular-pubescent, often aromatic. **Roots** of hygrophilous plants usually with a spongy outer covering. **Leaves** decussate or rarely verticillate; lamina linear to ovate or obovate, margin entire or serrate, the teeth usually gland-tipped, pointing upwards. **Flowers** small. **Sepals** 5, midrib prominent, margin membranous. **Petals** 5, delicate, white, pink or mauve. **Stamens** 10 (5 in *B. ammannioides*). **Ovary** 5-locular, bearing 5 short or long, patent styles with apical, usually capitate, stigmas (in older flowers these curve outwards and touch stamens; probably self-pollinated); ovules many. **Capsule** with 5 valves breaking away from hard, thin dissepiments; placentas bulging or recurved to horn-shaped, covered with short, hardened funicles; axis prolonged above into a subulate tip. **Seeds** very small, subcylindric to somewhat reniform, usually obtuse above and below, tesselated or smooth, yellow to brown or black. $x = 9$ or 12 (polyploidy).

Species ± 25, widespread in tropical and subtropical countries; 10 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, Northern, Western and Eastern Cape.

Elatine L. 5231000

Linnaeus: 367 (1753); Linnaeus: 172 (1754); Wild: 377 (1961); Obermeyer: 30 (1976).

Small, herbaceous, glabrous, aquatic or semi-aquatic annuals. **Leaves** decussate or verticillate, margin entire or serrulate; stipules small, deciduous. **Flowers** solitary in leaf axils, sessile or pedicels up to 5 mm long, very small, often cleistogamous; bracts 0. **Sepals** 2–4, connate below, midrib indistinct, margin not membranous. **Petals** 3 or 4, free, larger than sepals, white or pink. **Stamens** as many as, or twice as many as petals. **Ovary** globose, 3- or 4-locular; styles 3 or 4, minute, situated on depressed apex of ovary. **Capsule** globose, membranous, dissepiments remaining attached to central axis as wings. **Seeds** numerous, straight or bent to horseshoe-shaped, tesselate. $x = 9$ or 12 (high polyploidy).

Cosmopolitan with ± 12 species occurring in tropical, subtropical and temperate regions as aquatics or in moist situations; 2 in sthn Afr., Botswana, Northern Province, North-West, Gauteng, Mpumalanga and KwaZulu-Natal.

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Ericaceae

(Dilleniidae—Ericales)

Compiled by E.G.H. Oliver

Shrublets, shrubs or occasionally small trees. **Leaves** mostly whorled, sometimes alternate or spirally arranged, rarely opposite, simple, mostly 'ericoid' (linear, trigonous, with revolute margins almost touching on underside, leaving only a narrow channel or sulcus), rarely broad; stipules 0. **Flowers** bisexual, regular, axillary in various racemose

florescence types; bract on main axis or partially to fully recaulescent; bracteoles 2(1 or 0), sometimes fully recaulescent. **Calyx** 2–5-lobed or -partite, hypogynous, rarely perigynous. **Corolla** (2–)4(5)-lobed or -subpartite, hypogynous, rarely perigynous, persistent or deciduous. **Stamens** (3–)8(–10), free of fused, included to exserted; filaments, when free, linear to broadening towards base, pilose; anthers 2-thecous, 2-lobed to -partite, often with dorsal appendages; dehiscing by terminal or lateral, small to very long pores; pollen shed mostly as tetrads, occasionally as monads. **Ovary** superior, rarely half-inferior, (1–)4(–8)-locular with 1–many, axile, pendulous, rarely erect, ovules per locule; with or without basal nectaries; style terete, rarely almost absent; stigma simple to broadly funnel-shaped, entire to markedly lobed. **Fruit** mostly a loculicidal capsule, sometimes an indehiscent capsule, drupe, achene or berry. **Seeds** mostly ellipsoid or variously angled; testa thick or almost nonexistent; embryo embedded in copious endosperm.

Genera ± 140, species ± 4500, cosmopolitan, mostly in temperate and tropical regions; sthn Afr.: genera 2, species 771.

Bolus *et al.*: 2 (1905/6); Stevens: 1 (1971); Oliver: 158 (1991); Stevens: 1 (1995).

The 24 minor genera formerly recognised in the subfamily Ericoideae in sthn Afr. (Bolus *et al.* 1905/6; Oliver 1975; Oliver & Van Wyk 1993), are postulated to belong to the single monophyletic genus *Erica*. Some have been reduced to synonymy under *Erica* [Oliver: 1 (1988); Oliver: 771 (1993); Oliver: 121 (1994)] and the remainder are to be published soon (Oliver, in prep.). The following minor genera will be placed in synonymy of *Erica*: *Acrostemon* Klotzsch, *Anomalanthus* Klotzsch, *Arachnocalyx* Compton, *Coccosperma* Klotzsch, *Coilostigma* Klotzsch, *Eremia* D.Don, *Eremiella* Compton, *Grisebachia* Klotzsch, *Nagelocarpus* Bullock, *Platycalyx* N.E.Br., *Salaxis* Salisb., *Scyphogyne* Brongn., *Simocheilus* Klotzsch, *Stokoeanthus* E.G.H.Oliv., *Sympieza* Licht. ex Roem. & Schult., *Syndesmanthus* Klotzsch, *Thamnus* Klotzsch and *Thoracosperma* Klotzsch.

Key to genera

Leaves flat, more than 40 × 10 mm; corolla deciduous; ovary half-inferior ..... **Vaccinium**
Leaves ericoid, if flat then less than 10 × 5 mm; corolla persistent; ovary superior, half-inferior in one species ..... **Erica**

Erica L. 6237000

Linnaeus: 352 (1753); Guthrie & Bolus: 4 (1905) in part; Salter: 627 (1950) in part; Dulfer: 25 (1965) in part; Oliver (1975) in part; Oliver in broad sense, in prep.

Blaeria L.: 112 (1753); Oliver: 771 (1993). *Philippia* Klotzsch: 354 (1835); Oliver: 455 (1987). *Ericinella* Klotzsch: 222 (1838); Oliver: 121 (1994).

Shrublets, shrubs or occasionally small trees up to 5 m tall. **Leaves** 3- or 4-nate in whorls, occasionally 6-nate, rarely opposite or spirally arranged, mostly linear-oblong to ovate, trigonous, with revolute margins almost touching on underside (ericoid), less commonly broad, flat and open-backed but then less than 10 × 5 mm, sometimes very reduced and scale-like below florescences. **Flowers** always axillary, in 1–12 whorls variously arranged in elongate racemose to subumbellate florescences, either at ends of all leafy branches or of very short lateral branchlets or of only the main branches, sometimes forming dense synflorescences; pedicel usually present, sometimes very reduced, very rarely non-existent; bract always present, on the main axis to partially recaulescent to fully recaulescent forming abaxial lobe/segment of the calyx; bracteoles [0](1)2, sometimes fully recaulescent forming lateral lobes/segments of calyx. **Calyx** (2–)4-partite or -lobed, hypogynous, small and leaf-like or large and showy, rarely longer than corolla, sometimes enlarging and thickening considerably in fruiting stage. **Corolla** (2–)4-lobed, hypogynous but semiperigynous in 1 species, tubular, ampullaceous, urceolate, globose, ovoid, campanulate, cyathiform, obconic or funnel-shaped, small to large and brightly coloured, dull-coloured in most wind-pollinated species, persistent. **Stamens** (3–)8[–10], free or completely fused, included or exserted; anthers dorsifixed or basifixed, with or without simple or elaborate dorsal appendages, thecae partly united or sometimes free, with small subterminal pores or pores sometimes as long as thecae; pollen shed as tetrads or sometimes as monads. **Ovary** superior, half-inferior in 1 species, (1–)4[–8]-locular, with 1–180 ovules per locule, sessile or stalked nectaries usually prominent around base, sometimes absent in wind-pollinated species; style filiform, rarely nonexistent, exserted or included; stigma simple-truncate, capitate, peltate, cyathiform or funnel-shaped and considerably enlarged in wind-pollinated species, rarely 4-lobed. **Fruit** mostly a dehiscent loculicidal capsule, sometimes an indehiscent capsule, drupe or achene; seeds with thick testa, mostly alveolate, sometimes smooth or spiky, in indehiscent fruits testa sometimes very thin, transparent or almost nonexistent. $x = 12$.

Species 860. Africa, Madagascar and Europe: 770 confined to sthn Afr., Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal with the greatest diversity in Western and Eastern Cape.

Vaccinium L. 6216000

Linnaeus: 349 (1753); Brown: 1 (1905) under Vacciniaceae; Verdoorn: 92 (1954).

Shrubs up to 4 m tall. **Leaves** alternate, broad, flat, 40–60 × 10–20 mm. **Flowers** in small axillary racemes; bract much reduced, on main axis; bracteoles 2, much reduced. **Calyx** 4- or 5-lobed; tube short, adnate to ovary. **Corolla** 4- or 5-lobed, deciduous. **Stamens** 10, free; filaments broadening towards base, pilose; anthers dorsifixed near apex, with 2 small dorsal appendages, thecae produced into 2 long tubes opening by terminal pores; pollen shed as tetrads. **Ovary** half-inferior, 4- or 5-locular or falsely 10-locular owing to intrusion of partitions from placenta, with few to numerous ovules per locule; style slender, included; stigma simple or subcapitate. **Fruit** a berry ± the size of a small pea, crowned with persistent calyx lobes; seeds ellipsoid, with thick alveolate testa. $x = 12$ (polyploidy).

Species ± 450, cosmopolitan, mainly in South America and southeast Asia; 1 (*Vaccinium exul* Bolus) in sthn Afr., Drakensberg escarpment of Mpumalanga.

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Erythroxylaceae

(Rosidae—Linales)

Compiled by C.L. Bredenkamp

Trees, shrubs, or undershrubs, glabrous. **Leaves** usually alternate, occasionally opposite, simple, entire or sometimes slightly crenate; stipules intrapetiolar, rarely extrapetiolar, persistent, deciduous or caducous. **Flowers** regular, bisexual, rarely unisexual, small, solitary or fascicled or inflorescence a panicle of cymes; bracts present or absent. **Calyx** with (4)5(6) sepals, free or ± connate, persistent. **Petals** as many as sepals, free, imbricate, deciduous, usually with a transverse, bifid scale at base of limb, rarely wide, but if so, then texture of claw different from that of limb. **Stamens** twice as many as petals; filaments united at base. **Ovary** superior, usually 2- or 3-locular with 1 or 2 axile, pendulous ovules in each locule, sometimes all but one locule aborted; styles 3–5, free or more or less connate; stigmas oblique, depressed-capitate or clavate. **Fruit** a drupe.

Genera 4, species ± 260, tropical, especially American; in sthn Afr. genera 2, species 6.

Browne: 278 (1756); Sonder: 233 (1860); Engler: 109 (1902); Robson: 102 (1963).

Key to genera

Styles 2, completely united; stigmas flattened, spreading or reflexed; petal-nectaries small, hidden by sepals; flowers opening on leafless shoots ..... **Nectaropetalum**
Styles 3, rarely 2, free or partially united; stigmas capitate or obliquely capitate; petal-nectaries large, convolute, exceeding the sepals; flowers on leafy shoots ..... **Erythroxylum**

Erythroxylum P.Browne 3956000

Browne: 278 (1756); Sonder: 233 (1860); Robson: 103 (1963).

Shrubs or trees. **Leaves** alternate, membranous or coriaceous, entire; stipules caducous or occasionally subpersistent, sometimes crowded towards tips of leafless twigs, leaving conspicuous scars. **Flowers** small, pedicellate, solitary or fascicled. **Calyx** with 5(6) sepals, usually slightly connate at base. **Petals** free, usually with an erect, transverse, 2-fid appendage on inner face, occasionally with a transverse pocket. **Stamens** 10(12) connate at base into a cup- or saucer-shaped structure; filaments equal or unequal in length, inserted in 1 or 2 rows. **Ovary** superior, 3(2)-locular, with 1(2) ovule in each locule, if more than 1 locule sometimes all but one aborted; styles 3(2), free or connate at base or for half their length; stigmas subclavate, subglobose, or discoid, flat and recurved in the simple-styled species. **Fruit** a small, 1-seeded drupe. $x = 12$.

Species ± 250, cosmopolitan in tropical and subtropical regions; 4 in sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Eastern Cape; forests.

Nectaropetalum Engl. 3956010

Engler: 109 (1902); Phillips: 432 (1951) under *Erythroxylum*; Robson: 108 (1963).

Peglera Bolus: 362 (1907).

Shrubs or small trees, with twigs sometimes compressed. **Leaves** petiolate, simple, entire, more or less coriaceous, penninerved, with densely reticulate tertiary nervation; stipules intrapetiolar, usually completely united, caducous or deciduous. **Flowers** axillary, solitary or in few-flowered fascicles, heterostylous. **Sepals** (4)5, valvate, connate at base, ± coriaceous. **Petals** free, clawed, deciduous, white, nectary appendage small, rarely absent. **Stamens** united at base into shallow cup, sometimes with glands outside; filaments of equal or unequal length. **Ovary** 2-locular, each locule with 1 ovule; styles united; stigmas 2, free, spreading or reflexed. **Fruit** fleshy, oval, up to 10 mm long, green, turning yellow after falling.

Species 6, Africa; 2 in sthn Afr., KwaZulu-Natal and Eastern Cape.

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Escalloniaceae

(Rosidae—Rosales)

Compiled by M. Jordaan

Small trees or scrambling shrubs; dioecious or polygamous. **Leaves** alternate, simple, usually glandular-serrate, penninerved, midrib and lateral veins prominent below, often with domatia in axils; stipules usually 0 or minute. **Inflorescences** dense, much branched, axillary panicles, shorter than leaves. **Flowers** bisexual, sometimes unisexual, ± regular, small. **Calyx**: tube obconic, adnate to ovary; lobes 5, subulate, distant, triangular at base, puberulous, persistent. **Petals** 5, ± free, ovate-deltoid, perigynous, broad at base and confluent with epigynous disc, valvate, puberulous, persistent. **Stamens** 5, alternating with petals, inserted at margin of disc; filaments subulate, villous; anthers dorsifixed, villous, small, ovoid, the thecae separated by a thick connective. **Ovary** partly inferior, 2-locular; ovules many on axile placentas; styles 2, subulate, adherent or diverging; stigmas capitate. **Fruit** a small leathery capsule, half-inferior, 2-locular, dehiscing septicidally through persistent styles, many-seeded. **Seeds** small, irregularly obovoid or oblong-obovoid, sculptured, slightly curved; testa black; endosperm copious; embryo small or large.

Genera ± 9, ± 150 species; tropical and south temperate, mainly in South America and Australia, also eastern and central tropical and sthn Afr.; 1 genus, 1 species in sthn Afr.

Dumortier: 35, 37 (1829) as Escalloneae; Harvey: 305 (1862) as Saxifragaceae; Hooker: 629 (1865); Engler: 211 (1928) as Saxifragaceae subfamily Escallonioideae; Airy Shaw: 248 (1973) as Iteaceae; Verdcourt: 1 (1973) as Escalloniaceae; Brummitt: 564 (1992) as Escalloniaceae; Mabberley: 267 (1997) as Grossulariaceae.

Choristylis is sometimes placed in the Grossulariaceae in a broad sense (Cronquist 1981; Mabberley 1997) but is retained here in Escalloniaceae (as by Verdcourt 1973; Brummitt 1992). *Choristylis* and *Itea* are sometimes placed in the small family Iteaceae (Airy Shaw 1973), mainly because of their extraordinary 2-porate subisopolar pollen grains.

Choristylis Harv. 3241000

Harvey: 19 (1842); Harvey: 308 (1862); Hooker: 647 (1865); Engler: 214 (1928); Verdcourt: 1 (1973).

Description as for family.

Species 1, restricted to east, central and sthn Afr.: *Choristylis rhamnoides* Harv., Northern Province, Mpumalanga (eastern lowveld) to KwaZulu-Natal and Eastern Cape.

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Euphorbiaceae

(Dilleniidae—Malpighiales)

Compiled by R.H. Archer

Herbs, shrubs, trees, sometimes succulent, sometimes twining or climbing, monoecious or dioecious; latex often present, milky, sometimes watery, rarely reddish. **Leaves** alternate, rarely opposite, or in whorls, simple, rarely compound, sometimes rudimentary; indumentum simple to stellate or lepidote (sometimes absent); stipules free, rarely connate or absent. **Inflorescences** terminal or axillary, basically cymose; flowers solitary or in glomerules, these often grouped into spiciform or capitate thyrses or pseudanthia, sometimes in cyathia (*Euphorbia*); bracts often glandular. **Flowers** unisexual, regular, usually small, often dissimilar in the two sexes; perianth present or 0 in 1 or both sexes, usually of 5 segments, sometimes sepals and petals present, petals rarely united at base. **Male flowers**: stamens 1–50(–400), hypogynous, rarely perigynous; filaments free or connate; anthers 2(3 or 4)-thecous, opening lengthwise or sometimes by pores; ovary rudimentary or absent. **Female flowers**: ovary superior, (1–)2–5(–20)-locular, with 1 or 2 pendulous, apical-axile, inverted ovules in each locule; styles as many as carpels, free or ± connate, entire, 2-lobed or variously cut. **Disc** annular, entire or lobed, of free scales or absent. **Fruit** usually capsular, (1 or 2)3(4–7)-locular, mericarps elastically dehiscent from persistent columella, or indehiscent and drupaceous, or of a single nut or 2 or 3 connate nuts. **Seeds** with or without caruncle; embryo straight or curved; endosperm copious, oily, rarely 0, often poisonous.

Genera over 300, species over 5000; cosmopolitan, mainly in tropics.; sthn Afr.: genera 50, species 484.

Brown, Hutchinson & Prain: 216 (1915); Meyer: 1 (1967); Radcliffe-Smith: 1 (1987a); Radcliffe-Smith: 47 (1987b); Webster: 3 (1994a); Webster: 33 (1994b); Radcliffe-Smith: 1 (1996).

For keys and descriptions of 5 subfamilies and 49 tribes and subtribes, see Webster: 33 (1994b); Radcliffe-Smith: 1 (1996).

Key to subfamilies

1a Locules of ovary each with 2 ovules; pollen grains binucleate:
2a Leaves usually alternate, simple; petals present or 0; pollen grains not spiny ..... **Phyllanthoideae**
2b Leaves often opposite, compound; petals 0; pollen grains spiny ..... **Oldfieldioideae**
1b Locules of ovary each with 1 ovule; pollen grains binucleate or trinucleate:
3a Latex absent; petals present or 0; indumentum simple or stellate; pollen grains binucleate ..... **Acalyphoideae**
3b Latex present; pollen grains binucleate or trinucleate:
4a Latex reddish, yellowish or milky; indumentum often stellate or lepidote; petals mostly present (at least in staminate flowers) ..... **Crotonoideae**
4b Latex whitish, often caustic or toxic; indumentum simple or 0; petals 0 ..... **Euphorbioideae**

Key to genera

1a Herbs, sometimes woody at base, or succulent herbs or shrubs:
2a Leaves opposite or whorled:
3a Apparent flower (cyathium) a ± cup-shaped structure with glands around its rim enclosing several stamens (reduced male flowers) and a central reduced female flower ..... **Euphorbia**
3b Flowers male, female or bisexual, not borne in a cyathium:
4a Calyx 3-lobed ..... ***Mercurialis**
4b Calyx 5-lobed ..... **Adenocline**
2b Leaves mostly alternate, often much reduced in succulent species:
5a Apparent flower (cyathium) a ± cup-shaped structure with glands around its rim enclosing several stamens (reduced male flowers) and a central reduced female flower:
6a Cyathium with (2,3) 4 or 5 (6–8) separate glands ..... **Euphorbia**
6a Cyathium with a glandular rim open on one side ..... **Monadenium**
5b Flowers male, female or bisexual, not borne in a cyathium:
7a Plants twining or trailing, often with stinging hairs:
8a Inflorescences surrounded by 2 large foliaceous involucral bracts ..... **Dalechampia**
8b Inflorescences not involucrate:
9a Stinging hairs absent; capsule breaking into 4 dorsally winged cocci ..... **Plukenetia**
9b Stinging hairs usually present; capsule of 3 wingless cocci:
10a Styles united into a tube ..... **Tragiella**
10b Styles free above ..... **Tragia**
7b Plants erect to diffuse, not climbing or trailing:
11a Leaves palmately lobed, large, peltate; plant often tree-like ..... ***Ricinus**
11b Leaves not deeply palmately lobed; petiole attached to leaf base:
12a Petals present, at least in male flowers:
13a Indumentum stellate or lepidote:
14a Anthers reversed and filaments inflexed in bud, becoming erect in the open flower; racemes or spikes terminal ..... **Croton**
14b Anthers erect or twice flexed in bud ..... **Chrozophora**
13b Indumentum simple or 0:
15a Flowers in axillary fascicles:
16a Male disc of separate glands; stamens connate into a tube ..... **Clutia**
16b Male disc saucer-shaped; stamens free or connate basally ..... **Andrachne**
15b Flowers in racemose or cymose inflorescences:
17a Annual herbs; disc obsolete ..... **Caperonia**
17b Perennial herbs or shrubs; disc of 5 free glands or annular ..... **Jatropha**
12b Petals absent:
18a Female flowers usually subtended by accrescent bracts; styles laciniate with filiform segments, often red; anthers vermiform ..... **Acalypha**
18b Female flowers not subtended by accrescent bracts; styles not laciniate; anthers vermiform:
19a Styles 2; ovary 2-locular:
20a Flowers in terminal racemes ..... **Leidesia**
20b Flowers in terminal or axillary fascicles or cymules ..... **Seidelia**
19b Styles 3(4); ovary usually 3-locular:
21a Sepals 4–6, membranous, imbricate; stamens 2–6 in middle of flower ..... **Phyllanthus**
21b Sepals 3 or 4, valvate; stamens 3–30, usually intermingled with small glands ..... **Micrococca**
1b Shrubs or trees:
22a Leaves opposite or whorled:
23a Leaves in whorls of 4, leathery, glabrous ..... **Hyaenanche**
23b Leaves opposite:
24a Leaves glabrous; latex milky; stipules minute or 0 ..... **Excoecaria**
24b Leaves white-silky below; latex absent; stipules large, sheathing ..... **Androstachys**
22b Leaves mostly alternate, often much reduced to absent in succulents:

25a Apparent flower (cyathium) a ± cup-shaped structure with glands around its rim enclosing several stamens (reduced male flowers) and a central reduced female flower:
26a Cyathium with (2,3) 4 or 5 (6–8) separate glands ..... **Euphorbia**
26b Cyathium with a continuous, occasionally 2–5-notched glandular ring ..... **Synadenium**
25b Flowers male or female, not borne in cyathia:
27a Leaves palmately lobed to compound:
28a Leaves palmately compound with 5–7 petiolate leaflets, sparingly stellate above ..... **Schinziophyton**
28b Leaves palmately 5–11-lobed to -partite, without stellate hairs:
29a Leaves peltate; inflorescences unisexual ..... ***Ricinus**
29b Leaves attached at base; inflorescences bisexual ..... ***Manihot**
27b Leaves not compound nor deeply palmately lobed:
30a Petals present, at least in male flowers:
31a Indumentum stellate or lepidote:
32a Indumentum usually densely stellate or lepidote; fruit a globose capsule ..... **Croton**
32a Indumentum silver to ferruginous-silver; fruit very large, indehiscent ..... ***Aleurites**
31b Indumentum simple or 0:
33a Flowers in axillary fascicles:
34a Male disc of separate glands; stamens connate into a tube ..... **Clutia**
34b Male disc annular or cupular; stamens free or basally connate:
35a Male calyx lobes valvate ..... **Bridelia**
35b Male calyx lobes imbricate:
36a Male flowers with 3 sepals; ovary 0 ..... **Heywoodia**
36b Male flowers with 5 sepals; ovary rudimentary:
37a Male disc annular, villous ..... **Lachnostylis**
37b Male disc saucer-shaped, glabrous ..... **Andrachne**
33b Flowers in spicate, racemose, paniculate, thyrsiform or cymose inflorescences:
38a Flowers panicled or in 2- or 3-branched, fasciculate cymes, the female flowers surrounded by male ones ..... **Jatropha**
38b Flowers spicate or racemose:
39a Male calyx lobes imbricate ..... **Jatropha**
39b Male calyx lobes valvate:
40a Fruit large, up to 50 mm in diameter, tardily dehiscent ..... ***Vernicia**
40b Fruit up to 30 mm in diameter, dehiscent:
41a Inflorescences terminal; pistillode present ..... **Cavacoa**
41b Inflorescences axillary; pistillode 0 ..... **Cleistanthus**
30b Petals absent:
42a Female flowers usually subtended by accrescent bracts; style laciniate with filiform segments, often red; anthers vermiform ..... **Acalypha**
42b Female flowers, style and anthers not as above:
43a Sepals of male flowers open in bud (exposing anthers); typically with milky latex:
44a Spikes of male flowers dense, ovoid or globose; seeds caruncled ..... **Maprounea**
44b Spikes of male flowers narrow, elongate; seeds caruncled or not:
45a Male sepals 1 or 2, if 2 then vertical and flowers appearing compressed; stamens 5–50 ..... ***Homalanthus**
45b Male sepals 2–5; stamens 2 or 3(–8):
46a Inflorescence lateral; capsule large, inflated ..... **Excoecaria**
46b Inflorescence a terminal spike; capsule not more than 20 mm in diameter:
47a Inflorescence a lax spike; caruncle, if present, remaining attached to seed ..... **Sapium**
47b Inflorescence a dense spike, subcylindric; caruncle attached to the columella, separated from the seed ..... **Spirostachys**
43b Sepals of male flower closed in bud; latex mostly absent, if present, watery to reddish to milky:
48a Female calyx lobes pinnatifid ..... **Cephalocroton**
48b Female calyx lobes entire or ± obsolete:
49a Sepals of male flowers valvate in bud:
50a Bud scales coriaceous, persistent ..... **Erythrococca**
50b Buds naked:
51a Stamens 2–4; leaves with 3 or 4 prominent veins from base ..... **Macaranga**
51b Stamens ± 8; leaves penninerved ..... **Alchornea**
49b Sepals of male flowers imbricate in bud:
52a Fruit flattened, winged ..... **Hymenocardia**
52b Fruit not markedly winged:
53a Fruit indehiscent, drupaceous, usually 1-seeded by abortion:
54a Flowers in axillary fascicles; drupe ± globose ..... **Drypetes**
54b Flowers in spikes or racemes, often catkin-like; drupe compressed ..... **Antidesma**
53b Fruit dehiscent, sometime tardily so, mostly with more than 1 seed:
55a Flowers in leaf-opposed cymose glomerules; ovule 1 per locule ..... **Suregada**

55b Flowers in axillary inflorescences; ovules 2 per locule:
56a Pistillode absent in male flowers:
57a Male disc annular ..... **Margaritaria**
57b Male disc usually composed of ± separate glands ..... **Phyllanthus**
56b Pistillode present in male flowers:
58a Male disc composed of 5 separate glands ..... **Flueggea**
58b Male disc annular ..... **Pseudolachnostylis**

Acalypha L. 4407000

(Acalyphoideae—Acalypheae)
Linnaeus: 1003 (1753); Prain: 466 (1920); Radcliffe-Smith: 185 (1987a); Webster: 90 (1994b); Radcliffe-Smith: 182 (1996).

Herbs, undershrubs, shrubs, or trees; monoecious or rarely dioecious; indumentum simple, often glandular. **Leaves** alternate, petiolate, 3–7-nerved from base. **Inflorescence** various, when bisexual usually basal, when unisexual the male flowers often in long-peduncled spikes below female ones or in close-set spikes or some other variation. **Petals** 0. **Disc** 0. **Male flowers**: calyx splitting into 4 valvate lobes; stamens usually 8, attached to a slightly raised receptacle; filaments free; anther thecae separate, twisted; pistil absent. **Female flowers** usually subtended by accrescent bracts; calyx membranous, 3- or 4-lobed or -partite, imbricate, shorter than ovary; ovary 3-locular, with a single ovule in each locule; styles exserted, free or connate at base, variable. **Fruit** a 3-locular, 3-lobed capsule, soon dehiscing septicidally into bivalved cocci. **Seeds** subglobose or ellipsoid, with crustaceous testa; carunculate or not; albumen fleshy; cotyledons broad, flat. $x = 10$ (7, 12—1 report) (high polyploidy).

Species 450, cosmopolitan in warm regions: 22 from sthn Afr., widespread.

Adenocline Turcz. 4370000

(Crotonoideae—Adenoclineae)
Turczaninow: 59 (1843); Prain: 488 (1920); Webster: 101 (1994b); Radcliffe-Smith: 247 (1996).

Herbs, erect or diffuse; dioecious, rarely monoecious. **Leaves** alternate, rarely opposite. **Inflorescence** of axillary cymules, often passing into a terminal raceme or panicle, with several male flowers and few to solitary female ones. **Petals** 0. **Male flowers**: calyx deeply 5-lobed; disc glandular; stamens 6–12; filaments free; anther thecae ± separate. **Female flowers**: calyx deeply 5-lobed, imbricate; disc of 3 spatulate or broad glands; ovary 3-locular, with solitary ovule in each locule; styles bipartite, slightly united at base. **Fruit** a 3-lobed, globose capsule, breaking into bi-valved cocci. **Seeds** globose or ovoid, ecarunculate; testa thinly crustaceous; albumen fleshy; cotyledons scarcely broader than radicle. $x = 9$ (B-chromosomes).

Species 3 (or 8 in the sense of Prain): sthn Afr., fairly widespread; also Malawi.

Alchornea Sw. 4388000

(Acalyphoideae—Alchorneae)
Swartz: 98 (1788); Pax & Hoffmann: 220 (1914); Prain: 484 (1920); Radcliffe-Smith: 251 (1987a); Webster: 81 (1994b); Radcliffe-Smith: 151 (1996).

Trees or shrubs; dioecious, rarely monoecious; occasionally with watery latex. **Leaves** alternate, shortly petiolate, often 3-nerved from base, frequently glandular between nerves on lower surface at base; stipellate. **Inflorescence** of male flowers in axillary or lateral, simple or branched spikes, several to a bract and with female flowers in axillary spikes or racemes, solitary to a bract. **Petals** 0. **Disc** usually 0. **Male flowers**: calyx splitting into 2–5 valvate lobes; stamens 8 or rarely fewer; filaments free or nearly so; pistil 0. **Female flowers**: calyx 3–6-lobed, with lobes imbricate; ovary (1)2- or 3(4)-locular, with a single ovule in each locule; styles free, usually entire. **Fruit** a 2- or 3(4)-coccous capsule, with cocci bivalved, leaving persistent columella; endocarp crustaceous. **Seeds** subglobose, ecarunculate; testa crustaceous; albumen fleshy; cotyledons broad, flat. $x = 11$ (polyploidy).

Species ± 50, cosmopolitan in tropics; 6 African; 2 in sthn Afr.; Northern Province, Mpumalanga to N KwaZulu-Natal.

*__Aleurites__ J.R.Forst. & G.Forst. 4428000

(Crotonoideae—Aleuritideae)
Forster & Forster: 111, t. 56 (1776); Radcliffe-Smith: 176 (1987a); Webster: 114 (1994b). Radcliffe-Smith: 299 (1996); Stuppy *et al.*: 79 (1999).

Trees, indumentum stellate, silver; monoecious. **Leaves** alternate, simple, entire or palmately lobed, without glands in marginal sinuses between lobes, petiolate; stipules minute and fugacious. **Inflorescences** terminal, thyrsiform, androgynous, protogynous, with a solitary female flower terminating each major axis, lateral cymules male; bracts subulate, readily caducous. **Male flowers**: calyx valvate, 2- or 3-lobed; petals free, imbricate; disc 5-lobed; stamens 4-verticillate, ± 20, outer free, inner ± united, borne on a conical receptacle; anthers introrse; pistillode 0. **Female flowers**: calyx, petals and disc as in male flowers; ovary 2- or 3-locular, with 1 ovule per locule; styles 2 or 3, thick, bilobed. **Fruit** large, drupaceous, indehiscent, 2- or 3-locular or 1-locular by abortion; exocarp fleshy; endocarp thin, woody. **Seeds** ovoid, ecarunculate; testa thick, woody; albumen hard; embryo straight, embedded in copious endosperm; cotyledons broad, flat. $x = 11$ (polyploidy).

Species 2 from tropical Asia and Oceania; 1 in sthn Afr.: *__Aleurites__ *mollucana* (L.) Willd., Tung-nut, cultivated in Mpumalanga and KwaZulu-Natal in subtropical areas and may occur as escape.

Andrachne L. 4286000

(Phyllanthoideae—Phyllantheae)
Linnaeus: 1014 (1753); Hutchinson: 385 (1915); Webster: 42 (1994b); Radcliffe-Smith: 27 (1996).

Herbs, undershrubs, or shrubs; monoecious. **Leaves** alternate; stipulate. **Flowers** often in axillary fascicles (male) and solitary (female). **Male flowers**: sepals and petals 5(6); petals membranous, subequalling sepals; disc saucer-shaped, crenulate; stamens 5(6), free or subconnate at base; anthers subglobose; ovary rudimentary. **Female flowers**: sepals and petals as in male; disc saucer-shaped, crenulate; ovary 3-locular, with 2 ovules in each locule; styles bifid or bipartite. **Fruit** a 3-lobed capsule; endocarp thinly woody. **Seeds** ± 3-angled, somewhat wrinkled, ecarunculate; albumen fleshy; embryo curved, radicle long, cotyledons broad and flat. $x = 12$ (11) (polyploidy).

Species 15, mainly in warm parts of northern hemisphere; 1 in sthn Afr., *Andrachne ovalis* Müll.Arg.; Northern Province, Mpumalanga, KwaZulu-Natal, Eastern and Western Cape (near George).

Androstachys Prain 4345010

(Oldfieldioideae—Picrodendreae)

Prain: 438 (1908); Hutchinson: 377 (1915); Airy Shaw: 251 (1965) Androstachydaceae Airy Shaw; Airy Shaw: 519 (1970); Leroy: 147 (1976); Alvin: 579 (1987); Dahlgren & Van Wyk: 3 (1988) Androstachydaceae; Webster: 61 (1994b); Radcliffe-Smith: 120 (1996).

Trees, dioecious; rather rigid, even branchlets, decussately branched; branchlets adpressed silky-pilose, angled, articulated. **Leaves** decussate, petiolate, ovate to suborbicular, usually subcordate, densely silky on undersurface; stipules large, connate, sheathing, deciduous. **Flowers** axillary; male inflorescence a shortly pedunculate triad of cernuous, catkin-like spikes or racemes; female flowers solitary. **Petals** 0. **Disc** 0. **Male flowers**: calyx of 2–5 bract-like, spirally arranged, ciliate sepals; stamens many, spirally arranged on prolonged axis, with lowest filaments short and recurved, upper subsessile; anthers with thecae slightly divided and with few, long hairs at apex; pistil absent. **Female flowers**: calyx 5-partite, with ovate-acuminate, imbricate segments; ovary 3- or 4-locular, with 2 ovules in each locule; densely tomentose; styles connate into a pilose column; stigmas 3, spreading, large, linear-lanceolate. **Fruit** breaking up into 3 or 4 bivalved cocci, depressed-globose, often with dense indumentum. **Seeds** elliptic-globose; testa hard and shiny; embryo straight with two collateral rounded cotyledons, chlorophyllous; endosperm abundant, oily.

Species 1, Africa and Madagascar, *Androstachys johnsonii* Prain; Northern Province, Mpumalanga and Swaziland.

Antidesma L. 4327000

(Phyllanthoideae—Antidesmeae)

Linnaeus: 1027 (1753); Hutchinson: 405 (1920); Airy Shaw: 1076 (1966) Stilaginaceae; Radcliffe-Smith: 572 (1988); Webster: 52 (1994b); Radcliffe-Smith: 105 (1996).

Trees or shrubs; dioecious. **Leaves** alternate, large, entire; stipulate. **Inflorescence** a raceme or spike, often catkin-like, more rarely subpaniculate, sometimes male flowers in a spike and female in a panicle; bracts small, usually ciliate. **Petals** 0. **Male flowers**: calyx membranous, small, 3–5(–8)-lobed or -partite, imbricate; disc subentire or consisting of distinct glands; stamens (2)3–5(–10); ovary rudimentary. **Female flowers**: calyx as in male; disc annular, surrounding base of ovary; ovary 1(2)-locular, with 2 ovules in each locule; styles (2)3(–5), usually bilobed. Fruit a small, often oblique and compressed-ellipsoid, red or black drupe; endocarp hardened. **Seeds** usually solitary by abortion, ecarunculate; albumen fleshy; cotyledons broad, flat. $x = 13$ (high polyploidy, B-chromosomes).

Species ± 200, mostly in warmer parts of Old World; only 7 in Africa; 2 in sthn Afr., mainly *Antidesma venosum* Tul.; Namibia, Botswana, Northern Province, Mpumalanga, to KwaZulu-Natal and Eastern Cape.

Bridelia Willd. 4345000

(Phyllanthoideae—Bridelieae)

Willdenow: 978 (1806) as *Briedelia*; Hutchinson: 378 (1915); Radcliffe-Smith: 120 (1987a); Webster: 39 (1994b) adopting Willdenow's original spelling; Radcliffe-Smith: 12 (1996); proposal for spelling of name to be conserved.

Shrubs or small trees; monoecious or sometimes dioecious. **Leaves** alternate, petiolate, entire; stipulate. **Inflorescence** of axillary glomerules, rarely spicate, with female flowers fewer or solitary, sometimes pedicellate; bracts scale-like. **Male flowers**: sepals 5, usually small and scale-like, valvate; petals 5, obovate, shorter than sepals; disc entire or sinuately lobed; stamens 5; filaments connate; ovary rudimentary at apex of staminal column. **Female flowers**: sepals often narrower than those of male; disc double, the outer annular, the inner usually cup-like and surrounding base of ovary, or of separate scales; ovary 2(3)-locular, with 2 ovules in each locule; styles distinct or shortly connate, bilobed or subentire. **Fruit** a capsule separating into 2 cocci, or drupaceous or berry-like; endocarp crustaceous, forming 2 pyrenes. **Seeds** often solitary by abortion in each pyrene; albumen copious, fleshy; embryo curved; cotyledons broad, foliaceous. $x = 13$.

Species ± 60, Africa to Asia and Australia; 4 in sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga to KwaZulu-Natal and Eastern Cape.

Caperonia A.St.-Hil. 4361000

(Acalyphoideae—Chrozophoreae)

Saint-Hilaire: 244 (1824); Prain: 457 (1920); Radcliffe-Smith: 163 (1987a); Radcliffe-Smith: 448 (1989); Webster: 71 (1994b). Radcliffe-Smith: 138 (1996).

Erect annual herbs; monoecious, rarely dioecious. **Leaves** alternate, shortly petiolate; stipulate. **Flowers** in lax, axillary and solitary, pedunculate racemes; upper flowers male, lower 1 or more female. **Male flowers**: calyx closed in bud, ovoid or subglobose, splitting into 5 valvate lobes; petals 5, imbricate, subequal or with 2 lowest reduced or even obsolete; disc obsolete; stamens usually 10; filaments connate below into a column, 2-seriate above, free portion spreading; anthers short, ovoid, with 2 thecae pendulous from glandular connective and dehiscing longitudinally; ovary rudimentary, at apex of staminal column. **Female flowers**: sepals 5(or 6), generally unequal, imbricate, outer smaller than inner; petals 5, subequal; disc absent; ovary sessile, 3-locular, with ovules solitary in each locule; styles slightly connate at base, ovate, deeply laciniate. **Fruit** a capsule with bivalved cocci, with obtuse or subulate processes mixed with or passing into gland-tipped setae; endocarp thinly crustaceous; columella not usually persistent. **Seeds** subglobose or oblong-globose, with minutely punctate-reticulate testa, without caruncle but with thin adhering aril which may form a false raphe; albumen fleshy; cotyledons broad, flat. $x = 11$ (1 report, polyploidy).

Species ± 40, tropical to subtropical, mostly America, 6 in Africa; 2 in sthn Afr., Namibia, Northern Province, Mpumalanga lowveld to N KwaZulu-Natal.

Cavacoa J.Léonard 4353020

(Crotonoideae—Aleuritideae)

Léonard: 320 (1955); Radcliffe-Smith: 174 (1987a); Webster: 115 (1994b); Radcliffe-Smith: 304 (1996).

Trees with buttressed trunks; dioecious. **Leaves** alternate, simple, entire, very minutely translucent-punctate, petiolate; petiole longitudinally grooved or narrowly canaliculate along upper surface; stipules early caducous, leaving a conspicuous, ± semicircular scar. **Flowers** in terminal racemes with male ones in spikes of few-flowered fascicles and with pedicels articulated near base; bracts broad, soon caducous, overlapping when young in cone-like clusters at tips of branchlets. **Male flowers**: calyx membranous; sepals valvate in bud and splitting into 2 segments on opening; petals 4 or 5, free, imbricate; disc of 4 or 5(6) fleshy glands alternating with petals; stamens 15–30, with filaments erect in bud and arising from a central, cone-like receptacle; anthers subcordate with a somewhat fleshy, glabrous connective; anthers inclined and dehiscing longitudinally; ovary absent. **Female flowers**: sepals (4)5, free, imbricate; disc saucer-shaped; ovary 3–5-locular; ovules solitary in each locule; styles 3–5, bifid. **Fruit** a large capsule, 3–5-

lobed, of 3–5 bivalved cocci; pericarp thin, crustaceous; endocarp thick, woody; columella large, persistent. **Seeds** ecarunculate, ovoid-subglobose.

Species 3, Africa, 1 in sthn Afr., *Cavacoa aurea* (Cavaco) J.Léonard; Kenya, Mozambique to KwaZulu-Natal.

Cephalocroton Hochst. 4439000

(Acalyphoideae—Epiprineae)

Hochstetter: 370 (1841); Prain: 458 (1920); Radcliffe-Smith: 282 (1987a); Webster: 79 (1994b); Radcliffe-Smith: 149 (1996).

Shrubs, with stellate hairs; monoecious. **Leaves** alternate, shortly petiolate; stipules laciniate. **Inflorescence** a terminal raceme with male flowers in apical clusters and female flowers pedicelled, basal. **Petals** 0. **Male flowers**: calyx splitting into 3–5 valvate lobes; disc absent; stamens 5–8; filaments free; anther thecae separate in upper half; pistil rudimentary, columnar, entire or 2- or 3-lobed. **Female flowers**: sepals 4–6, unequal, shortly pinnatifid, accrescent in fruit, glandular and stellately hairy; disc small, annular; ovary 3(4)-locular, with a single ovule in each locule, glandular and stellately hairy; styles connate at base, lobed or multifid at apex. **Fruit** a woody capsule of 3(4) bivalved cocci. **Seeds** ovoid-subglobose, smooth, evenly greyish or marbled, ecarunculate; testa crustaceous and albumen fleshy; cotyledons broad, flat.

Species 5, Africa; Socotra, Madagascar and Comoro Islands and Sri Lanka; 1 in sthn Afr.: *Cephalocroton mollis* Klotzsch in Namibia, Botswana, Northern Province and KwaZulu-Natal.

Chrozophora Neck. ex Juss. 4355000

(Acalyphoideae—Chrozophoreae)

Jussieu: 27 (1824) as *Crozophora*, current name conserved; Prain: 457 (1920); Radcliffe-Smith: 160 (1987a); Webster: 73 (1994b); Radcliffe-Smith: 141 (1996).

Annual herbs, often diffuse, with stellate hairs or hispid; monoecious. **Leaves** alternate, petiolate; stipules small, setaceous. **Inflorescence** a short, dense, axillary raceme. **Male flowers**: calyx 5-partite, densely stellately hairy; petals 5, membranous, equalling or shorter than sepals; disc inconspicuous, of 5 glands or circular; stamens 5–15, in 1–3 series, outer filaments very short, the rest united into a minutely pubescent tube; ovary absent. **Female flowers**: calyx segments narrowly linear; petals small, setaceous or absent; disc swollen or of glands alternating with petals; ovary 3-locular, with single ovule in each locule, stellately hairy; styles bifid, papillate. **Fruit** a somewhat fleshy capsule, splitting into 3 cocci, leaving a columella; endocarp thinly woody. **Seed** ovoid or subglobose, smooth with woody testa, enveloped in thin shiny aril; albumen thick, fleshy; cotyledons broad, flat.

Species 10, S Europe, east Africa, central and S Asia; 1 in sthn Afr.: *Chrozophora plicata* (Vahl) Spreng., Northern Province near Punda Milia.

Cleistanthus Hook.f. ex Planch. 4343000

(Phyllanthoideae—Bridelieae)

Planchon: t. 779 (1848); Hutchinson: 382 (1915); Léonard: 421 (1960); Radcliffe-Smith: 130 (1987a); Webster: 38 (1994b); Radcliffe-Smith: 8 (1996).

Trees or shrubs; monoecious or rarely dioecious. **Leaves** alternate; stipulate. **Flowers** in axillary fascicles or short racemes; petals usually present. **Male flowers**: calyx segments 5, valvate; petals 5 or rarely 0, scale-like; disc entire or sinuately lobed; stamens 5, with filaments united in their lower half into a central column; anther thecae parallel, dehiscing longitudinally; ovary rudimentary within staminal column. **Female flowers**: calyx somewhat united at base; disc double, with inner part surrounding ovary; ovary 3-locular, with 2 ovules in each locule; styles bifid. **Fruit** a globose capsule, sometimes depressed, often 3-lobed, dehiscent into bivalved cocci; endocarp woody, separating from pericarp at maturity; columella persistent. **Seeds** usually 2 per coccus; albumen scanty or copious; cotyledons thick and fleshy. $x = 10, 11$.

Species ± 140, Africa, India to Australia; 1 in sthn Afr.: *Cleistanthus schlechteri* (Pax) Hutch.; subtropical forests of N KwaZulu-Natal.

Clutia L. 4448000

(Acalyphoideae—Clutieae)

Linnaeus: 1042 (1753); Prain: 427 (1920); Radcliffe-Smith: 331 (1987a); Webster: 64 (1994b); Radcliffe-Smith: 123 (1996).

Shrubs or subshrubs; dioecious, rarely monoecious. **Leaves** alternate, usually sessile or subsessile, sometimes ericoid; stipules small or 0. **Inflorescences** axillary; male inflorescences composed of many-flowered, axillary fascicles; female inflorescences composed of few-flowered fascicles, or flowers solitary; pedicels varying in length, those of female flowers articulate. **Male flowers**: sepals 5, united only at base, imbricate; petals usually ± as long as sepals, sessile or clawed, often with 1 or more glands at base within; disc of a single gland or of lobed glands at base of sepals; stamens 5; filaments connate into a tube; pistil rudimentary. **Female flowers**: sepals and petals as in male; disc commonly only in 1 series; ovary spherical, 3-locular, with a single ovule in each locule, hairy or warted; styles free or shortly connate at base, bi-fid or -lobed, sometimes very short; stigmas often thick and laminated. **Fruit** a usually woody capsule, subglobose, breaking into 3 partially loculicidal valves with woody endocarp, with thin septa partially adhering to columella. **Seeds** ovoid, black, shiny, carunculate, with crustaceous testa; albumen fleshy; cotyledons broad, flat.

Species ± 70, Africa and 2 in tropical Arabian Peninsula; 35 in sthn Afr., widespread.

Croton L. 4348000

(Crotonoideae—Crotoneae)

Linnaeus: 1004 (1753); Prain: 410 (1920); Radcliffe-Smith: 135 (1987a); Webster: 111 (1994b); Radcliffe-Smith: 275 (1996).

Eremocarpus Benth.: 53 t. 26 (1844).

Shrubs or trees, rarely herbs, usually with stellate hairs or orbicular scales; monoecious, rarely dioecious. **Leaves** usually alternate, rarely opposite or whorled, usually with 2 glands at apex of petiole. **Inflorescence** a spike or raceme, in monoecious plants usually with many male flowers above few female ones, occasionally with sexes mixed. **Male flowers**: calyx (4)5(6)-lobed or -segmented; petals usually present, equal or smaller than sepals; disc of free scales or adnate to base of sepals, sometimes indistinct; stamens 5–many, inserted on a usually pilose receptacle, anthers reversed and filaments inflexed in bud, becoming erect in open flower; ovary 0. **Female flowers**: calyx usually smaller than in male, somewhat accrescent in fruit; petals, when present, smaller than in male and sometimes reduced to tuft of hairs; disc as in male or annular; ovary (2)3(4)-locular, with a single ovule in each locule; styles usually recurved, 1–3 times dichotomously branched, sometimes multifid. **Fruit** a capsule, often globose, usually 3-locular, breaking into bivalved cocci, rarely subindehiscent; endocarp woody or crustaceous. **Seeds** smooth or rarely rugulose, triangular-convex in transverse section,

carunculate, often with hard testa and abundant fleshy albumen; embryo straight; cotyledons broad and flat. x = 10 (7, 8, 9, 11) (high polyploidy).

Species at least 800, pantropical, the majority American; ± 11 in sthn Afr., fairly widespread.

Dalechampia L. 4422000

(Acalyphoideae—Plukenetieae)
Linnaeus: 1054 (1753); Prain: 497 (1920); Webster: 95 (1994b); Radcliffe-Smith: 238 (1996).

Subshrubs or herbs, twining or climbing, sometimes from woody rootstock; monoecious. **Leaves** alternate, petiolate, entire, 3–5-lobed or -partite. **Inflorescences** few-flowered, surrounded by 2 large, veined and usually brightly coloured, simple or lobed bracts. **Petals** 0. **Disc** 0. **Male flowers**: calyx splitting into 4–6 valvate lobes; stamens usually 9–30; filaments united into a short or long column; pistil 0. **Female flowers**: calyx usually 6-partite; segments often coriaceous and accrescent in fruit; ovary 3(4)-locular with a single ovule in each locule, usually hairy; style simple, often thickening upwards, hollow at apex. **Fruit** a 3(4)-didymous capsule, somewhat woody, breaking into bivalved cocci. **Seeds** globose or ellipsoid, with raised, vein-like markings from base and with apical cap. x = 9, 11 (1 report each).

Species 110, fairly cosmopolitan in warm regions; 4 in sthn Afr., widespread.

Drypetes Vahl 4309000

(Phyllanthoideae—Drypeteae)
Vahl: 49 (1807); Hutchinson: 403 (1920); Radcliffe-Smith: 88 (1987a); Webster: 47 (1994b); Radcliffe-Smith: 87 (1996); Tokuoka & Tobe: 189 (1999). Embryological and *rbc*L gene sequence data suggest a separate familial placement: Putranjivaceae near Erythroxylaceae and Rhizophoraceae.

Trees or shrubs; dioecious, rarely monoecious. **Leaves** alternate, petiolate, often large; stipules caducous, rarely persistent. **Inflorescence** usually of axillary fascicles of flowers, sometimes flowers produced on older wood, usually pedicelled. **Petals** 0. **Male flowers**: sepals 4 or 5, deeply concave, imbricate, sometimes hairy; stamens 3–12(–50); filaments free; anthers sometimes large, ovate; disc concave, rarely cup-like, central, inside stamens; ovary 0 or rudimentary in middle of disc. **Female flowers**: calyx as in male; disc annular, cup- or saucer-shaped, sometimes thick and fleshy with papillae on inner surface and irregularly lobed on margin; ovary 1–4-locular, sometimes thick-walled and warty, with 2 ovules in each locule, usually hairy; styles short or absent; stigmas thick, flattened, bifid or entire. **Fruit** globose, ellipsoid or ovoid, sometimes large, indehiscent; pericarp somewhat fleshy, becoming indurated on drying; endocarp coriaceous, papery or bony. **Seeds** solitary by abortion, ecarunculate; albumen fleshy; embryo straight, cotyledons broad, flat. x = 10 (high polyploidy).

Species ± 200, mainly Old World tropics, few in West Indies and South America; 5 in sthn Afr., Northern Province, Mpumalanga to KwaZulu-Natal and Eastern Cape.

Erythrococca Benth. 4368000

(Acalyphoideae—Acalypheae)
Bentham: 506 (1849); Prain: 459 (1920); Radcliffe-Smith: 265 (1987a); Webster: 87 (1994b); Radcliffe-Smith: 165 (1996).

Shrubs; twigs lenticelled; buds covered with protective, persistent scales; dioecious. **Leaves** alternate; stipulate; stipules chartaceous or membranous, often accrescent and modified into weak thorns. **Flowers** usually racemose, small, with male flowers usually several within a bract, female solitary; pedicels capillary, articulate. **Petals** 0. **Male flowers**: calyx closed in bud, splitting into 3 or 4 valvate lobes; stamens (2–)10–40(–60), usually intermixed with small glands and sometimes surrounded by a ring of similar, free or connate glands; filaments free; anthers erect, 2-locular; locules free from base, opening by longitudinal, extrorse slits; ovary absent. **Female flowers**: calyx 2(–4)-partite; disc usually of 2(3) free scales or lobes; ovary 2- or 3-locular; ovules solitary in each locule; styles usually connate below; stigmas usually plumosely laciniate. **Fruit** 2(3)-coccous; cocci subglobose, opening loculicidally; valves coriaceous; subpersistent. **Seeds** subglobose, covered by a thin, fleshy, viscid, usually scarlet aril; testa crustaceous, foveolate-reticulate or smooth; albumen fleshy; embryo axile, radicle conical, cotyledons broad, flat. x = 10, 11 (1 report each, polyploidy).

Species ± 50, mainly Africa; 4 in sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga and KwaZulu-Natal.

Euphorbia L. 4498000

(Euphorbioideae—Euphorbieae)
Linnaeus: 450 (1753); Brown: 222 (1915); White, Dyer & Sloane: 59 (1941); Meyer: 1 (1967); Carter: 409 (1988); Webster: 128 (1994b); LaFon & Schwartz (general editors of *Euphorbia Journal*) (1983–1994).

Chamaesyce S.F.Gray: 260 (1821); Koutnik: 262 (1984); Carter: 415 (1988) treated as subgenus; Webster: 129 (1994b) artificial but usable group, although the recognition of *Chamaesyce* as a separate genus makes *Euphorbia* a paraphyletic group.

Poinsettia Graham: 412 (1836).

Annual or perennial herbs, shrubs or trees, usually with milky, usually caustic latex, often fleshy (succulent) and sometimes spinescent; monoecious, or less often dioecious. **Leaves** alternate or opposite, often much reduced in succulent species; with or without stipules, sometimes stipules spinescent in succulent species. **Inflorescences** axillary or terminal with flowers in cyathia: distinct, cup-shaped structures with (2–)4 or 5(–8) nectariferous glands around the rim alternating with (2–)4 or 5(–8) involucral lobes; inside involucre numerous very reduced male flowers and 1 female flower, or in separate involucres; sepals and petals 0 or rudimentary; cyathia solitary or 2–many in cymes, umbels, panicles, or clusters. **Male flowers** reduced to individual stamens which are usually arranged in groups opposite involucral lobes, often interspersed with bracteoles; pedicel articulated with filament; anthers 2-thecous, longitudinally dehiscent. **Female flowers** solitary within involucre surrounded by male flowers, sessile or on short pedicel, usually elongating after fertilisation, with or without much reduced calyx; ovary (2)3(4–7)-locular, with 1 pendulous ovule in each locule; styles usually 3, free or ± connate, entire or bifid. **Fruit** a capsule with carpels bivalved, sometimes fleshy but becoming woody at maturity, separating from persistent, central axis and opening along inner face. **Seeds** with smooth or sculptured surface; with or without caruncle. x = 6, 7, 9, 10, 11 (5, 8, 13, 19) (high polyploidy, B-chromosomes).

Species ± 1600, or over 2000 with some segregate genera like *Chamaesyce* included, worldwide; over 300 in sthn Afr., widespread, predominantly succulent in drier areas.

Excoecaria L. 4478010

(Euphorbioideae—Hippomaneae)
Linnaeus: 1288 (1759); Prain: 1018 (1913b); Léonard: 133 (1959); Radcliffe-Smith: 382 (1987a); Webster: 122 (1994b); Radcliffe-Smith: 315 (1996).

Trees or shrubs, glabrous, usually with milky latex; mostly dioecious, rarely monoecious. **Leaves** alternate

or opposite, entire or crenulate; stipules minute or absent. **Flowers** in uni- or occasionally bisexual, axillary spikes; male dense, female lax. **Petals** 0. **Disc** 0. **Male flowers** sessile or subsessile; calyx small, (2)3(–5)-lobed; lobes slightly imbricate; stamens (2)3(–8), exserted; filaments free; anthers longitudinally dehiscent; ovary 0. **Female flowers** shortly pedunculate; calyx (2)3-lobed; ovary (2)3-locular, each locule with 1 ovary; styles 3, shortly connate at base, entire. **Fruit** a large, inflated capsule breaking into (2)3 bivalved cocci; valves separating and coiling up; exocarp smooth, not separating from endocarp; endocarp thinly crustaceous; columella present. **Seeds** globose or ovoid, caruncle (? swollen funicle) separating from seed and remaining adnate to columella; testa crustaceous; albumen fleshy; cotyledons broad, flat. $x = 11, 12$ (high polyploidy).

Species ± 40, Africa to Asia and Australia; 2 in sthn Afr., Namibia, Botswana, KwaZulu-Natal and Eastern Cape.

Flueggea Willd. 4298000

Phyllanthoideae—Phyllantheae)
Willdenow: 637 (1806); Hutchinson: 402 (1920); Pax & Hoffmann: 60 (1931) as *Securinega* Juss.; Webster: 273 (1984); Radcliffe-Smith: 68 (1987); Webster: 43 (1994b); Radcliffe-Smith: 29 (1996).

Trees or shrubs, sometimes with abbreviated branchlets; dioecious or rarely monoecious. **Leaves** alternate, shortly petiolate, entire; stipulate. **Flowers** in axillary fascicles; male often many, female few or solitary. **Petals** 0. **Male flowers**: sepals (4)5(–7), unequal, membranous, imbricate, shortly ciliate; stamens (4)5(–7); filaments free; pistillodes present; disc of 5 glands, hairy; ovary rudimentary, 2- or 3-partite. **Female flowers**: sepals as in male; disc flat, annular, entire or nearly so; ovary (2)3(4)-locular, with 2 ovules in each locule; styles connate at base, bifid or bilobate, spreading. **Fruit** slightly fleshy, usually loculicidally dehiscent, small, globose; endocarp crustaceous. **Seeds** obtusely 3-angled, rounded on back, smooth, ecarunculate, testa thick, crustaceous; albumen scanty; embryo incurved; cotyledons ovate, elliptic or obovate, flat. $x = 8, 13$ (polyploidy).

Species 14, tropics and E Asia; 2 in sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga, KwaZulu-Natal and Eastern Cape.

Heywoodia Sim 4291010

(Phyllanthoideae—Wielandieae)
Sim: 326, t.140, fig.1 (1907); Hutchinson: 384 (1915); Radcliffe-Smith: 85 (1987a); Webster: 36 (1994b); Radcliffe-Smith: 6 (1996).

Trees; dioecious. **Leaves** alternate, large, entire; stipules 0. **Male flowers** in dense, axillary glomerules; sepals 3, imbricate, unequal; petals 5, membranous, imbricate, larger than sepals; disc shortly cupular, fleshy, with margins irregularly undulate; stamens 8–12, inserted inside disc, 2-seriate; outer stamens free, inner ones connate at base; anthers 2-thecous, with thecae somewhat distinct; ovary rudimentary, 3-fid. **Female flowers**: sepals and petals ± as in male flowers; ovary 4- or 5-locular, 2 ovules per locule; stigmas 4 or 5, sessile, bilobed. **Fruit** a capsule, subglobose, 4-locular, with 8–10 wrinkled (when dried) valves; endocarp bony. **Seeds** solitary per locule by abortion, somewhat trigonous, smooth, brown, ecarunculate; endosperm papery; embryo minute, cotyledons broad and flat.

Species 1, *Heywoodia lucens* Sim, tropical East Africa; KwaZulu-Natal and Eastern Cape.

***Homalanthus** A.Juss. 4480000

(Euphorbioideae—Hippomaneae)
Jussieu: 50, t.60 (1824) as *Omalanthus*; Pillans: 558 (1950); Webster: 120 (1994b); Esser: 555 (1996) proposal to conserve the spelling of name.

Shrubs or small trees, glabrous, with milky latex; monoecious or dioecious. **Leaves** alternate, long-petiolate, often peltate, with pair of glands at apex of petiole; stipules caducous. **Inflorescences** terminal or subterminal, pseudoracemose, solitary, usually bisexual, predominantly male with 1 or more female flowers at base; male bracts broad, with a pair of sessile glands at base. **Petals** 0. **Disc** 0. **Male flowers** pedicellate; sepals 1 or 2, if 2 then imbricate and vertically disposed; stamens 5–50, free, filaments short; pistillode 0. **Female flowers** long-pedicellate; sepals 2 or 3, open; ovary 2(3)-locular, with 1 ovule per locule; styles 2(3), connate at base, undivided or bilobate, straight, the adaxial stigmatic surface running length of arms, canaliculate and minutely papillose, abaxial surface glandular. **Fruit** 2(3)-lobed, subindehiscent or tardily loculicidally dehiscent; endocarp thinly crustaceous; columella small, subpersistent. **Seeds** ovoid-ellipsoid; endotesta crustaceous; caruncle fleshy, sometimes half-enclosing seed; cotyledons broad, flat. $x = 8, 9, 11$ (high polyploidy).

Species 35, Indo-Pacific region; 1 in sthn Afr.: *Homalanthus populifolius* Graham, cultivated and found as an escape in parts of the Cape Peninsula (Western Cape).

Hyaenanche Lamb. 4336000

(Oldfieldioideae—Caletieae)
Lambert: 52, t. 10 (1797).

Toxicodendrum Thunb.: 188 (1796) not of Gaertn.; Hutchinson: 408 (1920); Phillips: t. 837 (1941).

Shrub or small tree; dioecious. **Leaves** in whorls of 4, leathery, entire, glabrous; stipules obscure or 0. **Inflorescence** of male flowers axillary, densely cymulose, much shorter than leaves; in female 1–3 flowers, axillary, sessile. **Petals** 0. **Disc** 0. **Male flowers**: sepals 4–8(–12), rounded; stamens 8–30; anthers large; pistillode 0. **Female flowers**: sepals 3–8, in 2 series, the outer the smaller; ovary ovoid, 3- or 4-locular; with 2 pendulous ovules in each locule, tomentulose; styles 3–5, connate in lower half. **Fruit** a subglobose, 8-lobed capsule, with a crustaceous exocarp and bony endocarp, breaking into 2-valved cocci. **Seeds** black, shiny, carunculate; endosperm scanty; cotyledons green.

Species 1: *Hyaenanche globosa* (Gaertn.) Lamb., Western Cape; mountains of Vanrhynsdorp and Clanwilliam districts.

Hymenocardia Wall. ex Lindl. 4325000

(Phyllanthoideae—Hymenocardieae)
Lindley: 441 (1836); Hutchinson: 409 (1920); Airy Shaw: 262 (1965) Hymenocardiaceae Airy Shaw; Radcliffe-Smith: 577 (1988) Hymenocardiaceae; Webster: 53 (1994b) Hymenocardieae; Radcliffe-Smith: 113 (1996).

Trees or shrubs; dioecious; **Leaves** alternate, shortly petiolate, entire; stipulate. **Inflorescence** in male a catkin-like spike; in female a short raceme. **Petals** 0. **Disc** 0. **Calyx** 4–6-lobed. **Male flowers**: calyx lobes imbricate; stamens 4–6; filaments free or connate at base; anthers usually with conspicuous yellow or golden-coloured gland on back; pistil rudimentary. **Female flowers**: sepals free, 4–6(–8), caducous; ovary 2-locular, with 2 ovules in each locule; styles 2, free. **Fruit** a flat capsule with 2 large, apical wings or broadly winged on margin, splitting into cocci from central axis; pericarp subcrustaceous; endocarp thin, membranous. **Seeds** usually solitary in each coccus, flat with sparse endosperm.

Species 7 or 8, mostly tropical Africa; 1 in sthn Afr., *Hymenocardia ulmoides* Oliv.; Northern Province, KwaZulu-Natal.

Jatropha L. 4433000

(Crotonoideae—Jatropheae)

Linnaeus: 1006 (1753); Prain: 418 (1920); Radcliffe-Smith: 343 (1987a); Radcliffe-Smith: 141 (1991); Webster: 103 (1994b); Radcliffe-Smith: 253 (1996).

Perennial herbs or shrubs; monoecious, rarely dioecious. **Leaves** alternate, petiolate or subsessile, from simple to digitately lobed, rarely pinnately lobed; stipules various. **Inflorescence** a terminal, dichotomous cyme with lateral male flowers and terminal, solitary, female flowers. **Male flowers**: sepals usually 5, imbricate, often shortly connate at base, often with stalked glands on margin; petals 5, free or shortly connate at base, rarely obsolete; disc of 5 free glands, sometimes annular; stamens 6–10, rarely more, in 2 series; filaments connate at base; pistil 0. **Female flowers**: sepals, petals and disc as in male flowers; ovary glabrous or hairy, (1)2 or 3(–5)-locular, with a single ovule in each locule; styles free or connate at base, often bifid; stigmas laminated. **Fruit** a schizocarpic capsule, ovoid or subglobose, breaking septicidally or loculicidally into 3 bivalved cocci, rarely subdrupaceous and ± indehiscent; endocarp crustaceous or indurated. **Seeds** ovoid or oblong, carunculate, caruncle often much divided; testa crustaceous; albumen fleshy; cotyledons broad, flat. $x = 11$.

Species ± 156, cosmopolitan in tropics and subtropics; ± 19 in sthn Afr., widespread.

Lachnostylis Turcz. 4291000

(Phyllanthoideae—Wielandieae)

Turczaninow: 503 (1846); Hutchinson: 383 (1915); Dyer: 123 (1943); Webster: 37 (1994b).

Shrubs or small trees; dioecious. **Leaves** alternate, entire; stipulate. **Flowers** fasciculate, axillary, sometimes solitary in female. **Male flowers**: sepals 5, imbricate, subequal; petals 5, membranous; disc annular, villous; stamens 5, free or connate into a short, basal tube. **Female flowers**: sepals and petals as in male; disc annular, thick, villous; ovary globose, 2- or 3-locular, with 2 ovules in each locule, tomentose externally and internally; styles bifid. **Fruit** a capsule breaking up into 2-valved cocci. **Seeds** subglobose or hemispherical, smooth or slightly wrinkled.

Species 2, Western Cape and Eastern Cape.

Leidesia Müll.Arg. 4372000

(Acalyphoideae—Acalypheae)

MüllerArgau: 792 (1866); Prain: 399 (1913a); Prain: 462 (1920); Pax & Hoffmann: 284 (1913); Webster: 85 (1994b); Radcliffe-Smith: 159 (1996).

Herbs, delicate; monoecious. **Leaves** alternate or nearly opposite, petiolate, usually slightly crenate and with scattered setae on margin. **Inflorescence** of minute male flowers in fascicles arranged in terminal racemes and of a few female flowers towards base of rachis, subtended by a leafy bract. **Petals** 0. **Disc** 0. **Male flower**: calyx membranous, splitting into 3 valvate, setaceous lobes; stamens 3–7; filaments free or sometimes connate at base; pistil 0. **Female flowers**: calyx reduced to bract or obsolete; ovary 2-locular, with a solitary ovule in each locule, usually with few setae; styles 2, free, entire. **Fruit** a 2(1)-locular capsule, setose-muricate, globose. **Seeds** subglobose, with sculptured testa; albumen fleshy; cotyledons broad, flat.

Species 1, *Leidesia procumbens* (L.) Prain, sthn Afr., fairly widespread.

Macaranga Thouars 4400000

(Acalyphoideae—Acalypheae)

Thouars: 26 (1806); Prain: 485 (1920); Radcliffe-Smith: 239 (1987a); Webster: 87 (1994b); Radcliffe-Smith: 161 (1996).

Trees or shrubs, often with watery latex; dioecious, rarely monoecious. **Leaves** often large, alternate, petiolate, usually 3–7-nerved from base. **Inflorescence** a raceme or spike, lateral or forming a terminal, thyrsoid panicle, with male flowers glomerulate, several to a bract and female flowers solitary to each bract. **Petals** 0. **Disc** 0. **Male flowers**: calyx splitting into 3 or 4 valvate lobes; stamens (1)2 or 3(few); filaments short, usually free; anthers (2)4-thecous and (2)4-valved; pistil 0. **Female flowers**: calyx widely cupular or obliquely spathaceous, rarely splitting into 2 or 3 lobes; ovary (1)2- or 3(4)-locular, with a single ovule in each locule, sometimes glandular; styles free or shortly connate at base, sometimes 1, ligulate. **Fruit** a capsule with (1)2–several cocci, with cocci bivalved, granular-glandular, becoming smooth and glabrous when glands rub off. **Seeds** subglobose, smooth, shiny, exotesta fleshy, endotesta crustaceous; albumen fleshy; cotyledons broad, flat. $x = 11$ (10).

Species ± 300, mainly tropics of the Old World; 1 in sthn Afr., *Macaranga capensis* (Baill.) Sim, coastal forests of KwaZulu-Natal to border of Eastern Cape.

*__Manihot__ Mill. 4444000

(Crotonoideae—Manihoteae)

Miller: [851] (1754); Radcliffe-Smith: 366 (1987a); Webster: 99 (1994b); Radcliffe-Smith: 244 (1996).

Shrubs or trees, lactiferous; monoecious. **Leaves** alternate, simple or peltate, deeply 3–11-palmatilobed to palmatipartite; stipules small or large, sometimes leafy. **Inflorescences** racemose or paniculate, terminal or axillary in uppermost leaf axils, generally composed of 1 or more long-pedicellate basal female flowers and several short-pedicellate male flowers; bracts small or large, sometimes leafy. **Petals** 0. **Male flowers**: calyx campanulate, 5-lobed, often pigmented, with lobes imbricate; stamens 10 in 2 whorls, free, arising between lobes or glands of disc; pistillode small, trifid if present. **Female flowers**: calyx as in male flowers; disc hypogynous; ovary 3-locular, smooth or longitudinally winged; 1 ovule per locule; styles shortly connate at base. **Fruit** septicidally dehiscent into 3 bivalved cocci, smooth or longitudinally winged. **Seeds** carunculate; testa crustaceous; albumen fleshy; cotyledons flat, broad. $x = 9$ (polyploidy).

Species ± 100, America; **Manihot esculenta* Crantz, Cassava, with starchy, tuberous roots, cultivated in tropical areas, often occurs as escape.

Maprounea Aubl. 4485000

(Euphorbioideae—Hippomaneae)

Aublet: 895, t. 342 (1775); Prain: 511 (1920); Radcliffe-Smith: 395 (1987a); Webster: 123 (1994b); Radcliffe-Smith: 325 (1996).

Trees or shrubs, glabrous; monoecious. **Leaves** alternate, glaucous, with 1–4 glands underneath. **Flowers** in spikes terminating in abbreviated twigs, with many male flowers in dense heads and usually shortly pedicellate, female flowers at base; male bracts small, imbricate, glandular at base on each side, each 3–5-flowered; female bracts 1-flowered. **Petals** 0. **Disc** 0. **Male flowers**: calyx shortly 2- or 3-lobed, slightly imbricate in bud; stamens (1)2(3), exserted; filaments united below; anthers oblong; locules parallel, dehiscing longitudinally; ovary rudimentary. **Female flowers** pedicellate; pedicels extending in fruit; calyx 3(–6)-lobed; ovary (2)3(–5)-

locular, with 1 ovule in each locule; styles (2)3(–5)-lobed, connate at base, straight then reflexed, adaxial stigmatic surface canaliculate and minutely papillose. **Fruit** globose or slightly (2)3(–5)-lobed, dehiscing into (2)3(–5) bivalved cocci; exocarp thin, smooth, not separating from endocarp; endocarp ligneous; columella persistent. **Seeds** obovoid; outer testa smooth, slightly fleshy (sarcotesta); endotesta crustaceous, smooth, rugulose or foveolate; caruncle large, conical, shallowly 2-lobate, fleshy; albumen fleshy; cotyledons broad, flat.

Species 4, Africa and South America; 1 in sthn Afr., *Maprounea africana* Müll.Arg., Namibia and Botswana.

Margaritaria L.f. 4299020

(Phyllanthoideae—Phyllantheae)
Linnaeus f.: 66 (1782); Webster: 407 (1979); Radcliffe-Smith: 32 (1996).

Shrubs or trees; dioecious, rarely monoecious. **Leaves** distichous, shortly petiolate, entire; stipulate. **Inflorescence** axillary; male flowers several, fasciculate; female solitary or few per axil. **Petals** 0. **Male flowers**: sepals 4, membranous, free or slightly connate at base, imbricate; disc annular, entire; stamens 4, filaments free; ovary absent. **Female flowers**: pedicels stouter than in male; sepals, petals and disc as in male; ovary (2)3- or 4(5)-locular, with 2 ovules in each locule; styles 3, free or partly connate, usually bifid or bilobed. **Fruit** a capsule, dry or somewhat fleshy, irregularly dehiscent; exocarp green, usually separating from crustaceous endocarp. **Seeds** hemispherical; sarcotesta fleshy, bluish; sclerotesta thick, woody; chalaza invaginated; albumen fleshy; embryo straight; cotyledons thin, flat. $x = 13$.

Species 13; pantropical; 1 widespread in tropical and sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga, KwaZulu-Natal.

***Mercurialis** L. 4371000

(Acalyphoideae—Acalypheae)
Linnaeus: 1035 (1753); Prain: 461 (1920); Pillans: 559 (1950); Webster: 85 (1994b).

Annuals or perenial herbs; dioecious. **Leaves** opposite, often toothed. **Inflorescences** axillary, male slender with flowers in sparse distant clusters on distal half of rachis; female usually short with 1 or 2 subsessile flowers. **Petals** 0. **Disc** 0. **Male flowers**: calyx split in 3 valvate lobes; stamens 8–20, filaments free, attached to a small receptacle; ovary 0. **Female flowers**: ovary 2(3)-locular; ovules solitary; styles erect, free, almost to base, undivided. **Fruit** a capsule; 2(3)-coccous, breaking up into bivalved cocci; endocarp crustaceous. **Seeds** ovoid or globose, smooth or rough; testa crustaceous; albumen fleshy; cotyledons broad, flat. $x = 8$ (6, 7) (high polyploidy).

Eurasian genus of 8 species; **Mercurialis annua* L., common introduction into waste places and gardens, mainly Western Cape.

Micrococca Benth. 4367000

(Acalyphoideae—Acalypheae)
Bentham: 503 (1849); Prain: 460 (1920); Radcliffe-Smith: 260 (1987b); Webster: 88 (1994b); Radcliffe-Smith: 176 (1996).

Herbs or shrubs; monoecious or dioecious. **Leaves** alternate, often large and serrate; stipulate. **Inflorescence** a raceme or spike with male flowers glomerulate and distant, with an occasional pedicellate female flower. **Petals** 0. **Male flowers**: calyx splitting into 3 or 4 valvate lobes; disc 0; stamens 3–30, usually intermixed with small glands and sometimes surrounded by a ring of similar, free or connate glands; filaments free; pistil 0. **Female flowers**: calyx 2–4-partite; lobes imbricate; disc glands 2–6, resembling staminodes, alternating with carpels, rarely saucer-shaped; ovary (2)3(4)-locular, with a solitary ovule in each locule; styles 3(4), free or connate near base, plumose-laciniate. **Fruit** a capsule breaking up into (2)3(4) bivalved cocci or by abortion 1 coccus, separating septifragally from a crustaceous or woody columella; pericarp thin; endocarp crustaceous. **Seeds** subglobose, enclosed by thin aril; testa crustaceous, foveolate-reticulate, sometimes muricate or smooth; albumen fleshy; cotyledons suborbicular, sometimes scarcely larger than radicle. $x = 10$ (polyploidy).

Species 12, mostly tropical Africa, also Madagascar to Asia; 2 in eastern parts of sthn Afr.

Monadenium Pax 4503000

(Euphorbioideae—Euphorbieae)
Pax: 126 (1894); Burtt Davy: 290 (1932); White, Dyer & Sloane: 941 (1941); Bally: 14 (1961); Carter: 540 (1988); Webster: 129 (1994b); Forster: 142 (1996).

Perennial herbs, fleshy shrubs or small trees, usually with fleshy or tuberous rootstock, fleshy or succulent stems and branches and caustic milky latex; monoecious. **Leaves** alternate, ± fleshy; stipules modified as glands or spines or 0. **Inflorescence** axillary, of sessile cyathia in dichotomously branching cymes, cyathia rarely solitary; bracts paired, free or partly united along one edge to form a bract-cup behind and enveloping the involucre, persistent; involucre cup-like, but with opening down one side and with a continuous gland around rim and with 5 fringed lobes within. **Flowers** produced within involucres; sepals and petals 0 or rudimentary. **Male flowers** in 5 groups, reduced to individual stamens which are arranged in groups opposite involucre lobes; pedicels articulated with filaments, sometimes bracteate. **Female flowers** solitary within involucre, surrounded by male flowers, on short or slightly elongated pedicel, with or without much-reduced calyx; ovary recurved and exserted from slit in involucre, 3-locular, with single, pendulous ovule in each locule; styles 3, free or united below, bifid at apex. **Fruit** a capsule, 3-angled, with or without a double keel down angles. **Seeds** oblong, with a cup-like, pale yellow caruncle, rarely ecarunculate. $x = 17$ (12, 19) (high polyploidy).

Species ± 50, Africa; 1 in sthn Afr., *Monadenium lugardiae* N.E.Br.; Botswana, Northern Province and KwaZulu-Natal.

Phyllanthus L. 4299000

(Phyllanthoideae—Phyllantheae)
Linnaeus: 987 (1753); Hutchinson: 386 (1920); Radcliffe-Smith: 10 (1987a); Webster: 44 (1994b); Radcliffe-Smith: 36 (1996).

Herbs, undershrubs from perennial rootstocks, shrubs, or trees; monoecious or sometimes dioecious. **Leaves** scale-like cataphylls or foliage leaves, alternate; stipulate. **Inflorescence** mainly of many fascicled male flowers and solitary female flowers in upper axils. **Petals** 0. **Male flowers**: sepals 4–6, membranous, free or slightly connate at base, imbricate; disc often small, of separate glands, rarely annular; stamens 2–6, in middle of flower; filaments free or connate, or some free and some connate; ovary 0. **Female flowers**: sepals as in male or larger; disc usually annular, saucer- or cup-shaped, rarely of separate glands; ovary 3(–many)-locular, with 2 ovules in each locule; styles 3, free or partly connate, usually bifid or bilobed. **Fruit** a capsule, dry or somewhat fleshy, dehiscent or subdehiscent; endocarp usually crustaceous. **Seeds** 3-angled, often longitudinally sulcate or pitted; testa thinly crustaceous; albumen fleshy; embryo straight or slightly incurved; cotyledons flat,

straight or rarely flexuous. $x = 13$ (6, 7, 8, 9, 10, 11, 12) (aneuploids, high polyploidy, B-chromosomes).

Species 750–800; cosmopolitan in tropical and subtropical regions, ± 150 in Africa; 22 in sthn Afr., widespread.

Plukenetia L. 4421010

(Acalyphoideae—Acalypheae)
Linnaeus: 1192 (1753); Prain: 496 (1920); Webster: 93 (1994b).

Pterococcus Hassk.: 41 (1842) not of Pallas, name conserved; Meyer: 41 (1967); Radcliffe-Smith: 210 (1996).

Herbs, undershrubs, or rarely shrubs, usually twining; monoecious. **Leaves** alternate, petiolate, entire or toothed, 3–5-nerved from base. **Inflorescence** leaf-opposed or sometimes axillary racemes; male flowers ± glomerulate above; female flowers solitary towards base, rarely 0. **Petals** 0. **Disc** 0. **Male flowers**: calyx with 4 or 5 valvate lobes; stamens 8–20; filaments free, sometimes inserted on a fleshy receptacle; pistil rudimentary or 0. **Female flowers**: calyx with 4 or 5 imbricate lobes; ovary usually 4-locular, with a single ovule in each locule; styles connate into a hollow, cylindric or subglobose column crowned with free, stigmatic lobes. **Fruit** a capsule, strongly 4-lobed, breaking into bivalved, dorsally winged cocci. **Seeds** globose or compressed; testa crustaceous, sometimes winged; albumen fleshy; cotyledons broad, flat.

Species ± 15, mostly neotropical, 3 in Africa; 1 variable species in sthn Afr., *Plukenetia africana* Sond., usually known as *Pterococcus*; Namibia, Botswana and Northern Province.

Pseudolachnostylis Pax 4295000

(Phyllanthoideae—Phyllantheae)
Pax: 19 (1899); Hutchinson: 407 (1920); Radcliffe-Smith: 80 (1987a); Webster: 41 (1994b); Radcliffe-Smith: 22 (1996).

Trees or shrubs; dioecious, rarely monoecious. **Leaves** alternate, petiolate, entire, somewhat coriaceous; stipulate. **Inflorescence** of male flowers in few-flowered, pedunculate cymes, surrounded by bracts; female flowers axillary, usually solitary. **Petals** 0. **Male flowers**: sepals 5(6), imbricate; disc annular, glabrous; stamens (4)5–7; filaments connate for greater part of their length; ovary rudimentary, 2-fid. **Female flower**: sepals as in male, with circumscissile dehiscence; disc ± basin-shaped, partially surrounding ovary; ovary 3-locular, with 2 ovules in each locule, often densely villous; styles 3, slightly connate at base, bilobed. **Fruit** globose, tardily septicidally dehiscent, subdrupaceous; exocarp smooth, shiny, becoming wrinkled on drying; endocarp thick, woody. **Seed** solitary in each locule by abortion, ellipsoid-ovoid, ecarunculate; albumen fleshy; cotyledons broad and flat.

Species 1, *Pseudolachnostylis maprouneifolia* Pax with 4 varieties, Africa; Namibia, Botswana, Northern Province and Mpumalanga.

***Ricinus** L. 4424000

(Acalyphoideae—Acalypheae)
Linnaeus: 1007 (1753); Henderson & Anderson: 206 (1966); Radcliffe-Smith: 322 (1987a); Webster: 84 (1994b); Radcliffe-Smith: 156 (1996).

Large annual or perenial herbs, often attaining tree proportions; monoecious. **Leaves** alternate, petiolate, peltate, palmately lobed, lobes glandular-serrate; petioles adaxially glandular near base; stipules present, united to form a sheath, caducous. **Inflorescences** leaf-opposed or subterminal, paniculate; male flowers in tight clusters in lower half; female flowers in open clusters in upper half, or rarely all female. **Petals** 0. **Disc** 0. **Male flowers** pedicellate; calyx membranous, splitting into 3–5 valvate lobes; stamens up to 1000; filaments variously united to form much-branched structures. **Female flowers** pedicellate; sepals 5, valvate, caducous; ovary 3-locular, with 1 ovule per locule; styles 3, ± free or connate at base, bipartite. **Fruit** 3-lobed, echinate or rarely smooth, dehiscing into 3 bivalved cocci; spines (if present) accrescent; endocarp crustaceous or thinly woody; columella persistent, 3-winged. **Seeds** sometimes dorsiventrally compressed-ovoid, smooth, carunculate, usually marmorate; testa crustaceous; albumen fleshy; cotyledons broad, flat. $x = 5$.

Monotypic, originally native to NE Africa, **Ricinus communis* L., Castor Oil, cultivated in warm parts, mainly in Northern Province, often occurs as an escape.

Sapium P.Browne 4483000

(Euphorbioideae—Hippomaneae)
Browne: 338 (1756); Prain: 513 (1920); Radcliffe-Smith: 389 (1987a); Webster: 123 (1994b); Radcliffe-Smith: 318 (1996).

Trees or shrubs, usually with milky latex; monoecious, rarely dioecious. **Leaves** alternate, entire or remotely toothed; stipules 0. **Inflorescence** a terminal, bisexual spike with many male flowers above and few basal female flowers, bracteate; bracts sometimes with 2 or 3 glands on either side at base. **Petals** 0. **Disc** 0. **Male flowers**: calyx 2- or 3(4)-lobed; stamens 2 or 3(4); filaments free; pistil absent. **Female flowers** long-pedicellate; calyx 2- or 3(4)-lobed; ovary (2)3(4)-locular, with 1 ovule in each locule; styles (2)3(4), free or slightly connate at base, sometimes spreading around ovary. **Fruit** a capsule, often woody, (2)3(4)-coccous, globose, often wrinkled; cocci bivalved or subindehiscent or bacciform; endocarp smooth or cornute, often coriaceous; endocarp woody or crustaceous, thick or thin; columella generally persistent. **Seeds** (1)2 or 3(4) per fruit, globose or ellipsoid, rarely carunculate; sarcotesta thin or fleshy; endotesta crustaceous; albumen fleshy; cotyledons broad, flat. $x = 11$ (10) (high polyploidy, B-chromosomes).

Species ± 125, pantropical but predominantly neotropical; 2 in sthn Afr., Mpumalanga, KwaZulu-Natal to Eastern Cape.

Schinziophyton Hutch. ex Radcl.-Sm. 4463010

(Crotonoideae—Ricinodendreae)
Radcliffe-Smith: 157 (1990); Webster: 113 (1994b); Radcliffe-Smith: 296 (1996).

Ricinodendron Müll.Arg.: 533 (1864) in part.

Pachycaul trees; dioecious. **Leaves** alternate, digitately compound, with 5–7 petiolulate leaflets, sparsely stellately hairy above, densely so below; stipules small, fugacious. **Inflorescence** a panicled cyme. **Male flowers**: sepals 4 or 5, densely stellate-pubescent; petals 5, connate into a wide, ± truncate tube; stamens 13–21, free; filaments often hairy at base; disc of 5 ± free, quadrate bodies attached to base of petals; pistil 0. **Female flowers**: sepals and petals similar to those of male; staminodes 0; disc crenulate; ovary 1- or 2-locular, with a single ovule in each locule, densely stellate-hairy; style 2-lobed or -partite or divided for half its length into 2 lobes. **Fruit** drupaceous, ± size of large walnut, densely fulvous-tomentose, with thick, woody, pitted endocarp divided by membrane into 2 portions except at base and apex. **Seeds** compressed-ellipsoid, ecarunculate, irregularly ridged on outer face; albumen copious, fleshy, oily; cotyledons flat, broad, palminerved.

Species 1, Africa; *Schinziophyton rautanenii* (Schinz) Radcl.-Sm.; Namibia, Botswana and Northern Province.

Seidelia Baill. 4373000

(Acalyphoideae—Acalypheae)
Baillon: 465, t. 9, fig. 7 (1858); Pax & Hoffmann: 282 (1914); Prain: 464 (1920); Webster: 85 (1994b).

Herbs, annual; monoecious. **Leaves** alternate. **Inflorescence** of small flowers in glomerules of cymules at end of branches or in axils of upper leaves; male flowers in dense fascicles above; female fewer, below. **Petals** 0. **Disc** 0. **Male flowers**: calyx membranous, splitting into 3 valvate lobes; stamens 3(2); filaments connate towards base; anther thecae somewhat separate and deeply grooved; pistil 0. **Female flowers**: calyx as in male; ovary 2-locular, with a single ovule in each locule; styles 2, short, undivided. **Fruit** a 2-lobed, smooth capsule; cocci bivalved. **Seeds** ovoid; testa crustaceous, sculptured.

Species 3, sthn Afr., Free State, Northern Cape and Western Cape.

Spirostachys Sond. 4478000

(Euphorbioideae—Hippomaneae)
Sonder: 106 (1850); Prain: 512 (1920); Radcliffe-Smith: 385 (1987a); Webster: 121 (1994b); Radcliffe-Smith: 313 (1996).

Trees or shrubs, usually with milky latex; monoecious or dioecious. **Leaves** alternate, shortly petiolate, entire or remotely crenate, with 2 glands at junction of petiole; stipules small, caducous. **Inflorescence** axillary, sessile, spicate, with many male flowers above and a solitary or few basal, female flowers. **Petals** 0. **Disc** 0. **Male flowers** small, sessile; calyx (2–)5-lobed, free, imbricate; stamens 3; filaments free or united into a slender tube, exserted; pistillode 0. **Female flowers** small, shortly pedunculate; calyx 3–5-lobed, ± free; ovary (2)3-locular, with 1 ovule in each locule, glabrous; styles (2)3, connate into a column, with lanceolate, entire lobes. **Fruit** a (2)3-coccous capsule, valves not separating immediately; exocarp smooth, not separating from endocarp; endocarp thinly crustaceous; columella persistent. **Seeds** globose or ovoid; caruncle minute, separating from seed and remaining adnate to columella; testa crustaceous; albumen fleshy; cotyledons broad, flat.

Species 2; subtropical East Africa; Namibia, Northern Province and KwaZulu-Natal.

Suregada Roxb. ex Rottler 4464000

(Crotonoideae—Gelonieae)
Rottler: 206 (1803); Merrill: 79 (1951); Radcliffe-Smith: 376 (1987); Webster: 102 (1994b); Radcliffe-Smith: 249 (1996).

Gelonium Roxb. ex Willd.: 831 (1806) non Gaertn.: Prain: 494 (1920).

Trees or shrubs; dioecious, rarely monoecious. **Leaves** alternate, sessile or subsessile, entire or crenate, gland-dotted, glabrous; stipules connate, caducous. **Flowers** in leaf-opposed, sessile or subsessile, cymose glomerules. **Petals** 0. **Male flowers**: sepals (4)5(–7), imbricate, often unequal, 3 outer ones concave and with blunt horn on back; disc shallowly basin-shaped, hairy; stamens 6–25(–60); filaments free; pistil 0. **Female flowers**: sepals similar to those of male; disc shallowly basin-shaped, sometimes bearing rudimentary staminodes, hairy; ovary (2)3(4)-locular, with 1 ovule in each locule, glabrous; styles (2)3(4), shortly bifid or lacerate. **Fruit** somewhat woody, globose, columella persistent, or 3-didymous, capsular or drupaceous, (2)3(4)-locular, or by abortion 1-locular. **Seeds** ovoid, with thin pulpy sarcostesta and crustaceous, smooth or foveolate-reticulate endotesta, ecarunculate; albumen fleshy; cotyledons broad, flat.

Species ± 40, Old World tropics, 8 in Africa; 3 in eastern parts of sthn Afr.

Synadenium Boiss. 4500000

(Euphorbioideae—Euphorbieae)
Boissier: 187 (1862); Brown: 220 (1915); White, Dyer & Sloane: 951 (1941); Carter: 534 (1988); Webster: 129 (1994b).

Shrubs or small trees, with branches fleshy, cylindrical, containing copious caustic milky latex; monoecious. **Leaves** alternate, usually large and fleshy; stipules modified as small but conspicuous dark brown glands. **Inflorescence** with sessile cyathia in dichotomously branching axillary cymes, usually crowded into pseudoumbels at branch apices; bracts at base of involucres paired, persistent. **Involucres** with an entire (rarely lobed), spreading, furrowed, glandular rim and 5 fringed lobes. **Sepals** and **petals** 0 or rudimentary. **Male flowers** reduced to individual stamens which are arranged in 5 groups opposite involucral lobes; stamens shortly exserted from involucre; bracteoles present. **Female flowers**: solitary within involucre, surrounded by male flowers, sessile or on short pedicel, pedicel elongating slightly in fruit; perianth reduced to 3-lobed rim below ovary; ovary 3-locular, with 1 pendulous ovule in each locule; styles 3, united below, with bifid stigma. **Fruit** a dehiscent capsule. **Seeds** with a sessile, often rudimentary caruncle. $x = 9$ (polyploidy).

Species 19, Africa; 1 in sthn Afr., *Synadenium cupulare* (Boiss.) Wheeler; Northern Province, Mpumalanga to N KwaZulu-Natal.

Tragia L. 4416000

(Acalyphoideae—Plukeneteae)
Linnaeus: 980 (1753); Prain: 502 (1920); Radcliffe-Smith: 291 (1987a); Webster: 95 (1994b); Radcliffe-Smith: 216 (1996).

Ctenomeria Harv.: 29 (1842).

Herbs, twining; with stinging hairs; monoecious. **Leaves** alternate, petiolate, cordate, usually lobed. **Inflorescence** a raceme, terminal or leaf-opposed, with many male flowers above and 1 or 2 basal female flowers. **Petals** 0. **Disc** 0. **Male flowers**: calyx herbaceous, with 5 valvate lobes; stamens 2–5(–50) on hemispherical receptacle; filaments free; anthers linear, minutely apiculate; pistil 0. **Female flowers**: calyx 6-partite; segments pectinately lobulate on each side, setose; ovary 3-locular, with a single ovule in each locule, setose; styles 3, free or connate below, densely papillose. **Fruit** a 3-coccous capsule, with cocci 2-valved. **Seeds** globose, ecarunculate; albumen fleshy; cotyledons broad, flat. $x = 12$ (aneuploids, high polyploidy).

Species ± 125, cosmopolitan in warm areas; 14 in sthn Afr., widespread. *Ctenomeria* Harv., with more than 30 stamens, may be recognised as a separate genus.

Tragiella Pax & K.Hoffm. 4416020

(Acalyphoideae—Plukenetieae)
Pax & Hoffmann: 104 (1919); Radcliffe-Smith: 318 (1987); Webster: 94 (1994b); Radcliffe-Smith: 212 (1996).

Sphaerostylis Baill.: 466, t. 21 (1858) in sense of some authors; Webster: 94 (1994b), endemic to Madagascar but doubtfully separable.

Perennial herbs, usually twining, up to ± 3 m long; with stinging hairs; monoecious. **Leaves** alternate, long-petiolate, finely toothed; stipulate. **Flowers** in lateral, pedunculate racemes, with many bracteate male flowers above and 1 or 2 female flowers at base. **Petals** 0. **Male flowers**: calyx 3-partite, valvate above, at length with lobes folded inwards and resembling a disc; stamens 3(4), alternating with sepals; filaments united into a short column; anthers at first erect and later becoming reflexed, apiculate, with longitudinal, introrse dehiscence; ovary usually 0. **Female flowers**: calyx 6-partite;

lobes pinnately 8–10-lacinulate on each side; ovary 3-lobed, with single ovule in each locule, hispid; styles 3, united almost to apex into a slender tube, with spreading stigmas. **Fruit** a 3-didymous capsule, dehiscing into 3-bivalved cocci; pericarp thin, crustaceous; endocarp woody; columella trifid, not persistent. **Seeds** globose, ecarunculate; cotyledons broad, flat.

Species 5, Africa; 1 in sthn Afr., *Tragiella natalensis* (Sond.) Pax & K.Hoffm. in eastern parts of sthn Afr.

*Vernicia Lour. 4428010

(Crotonoideae—Aleuritideae)

Loureiro: 586 (1790); Radcliffe-Smith: 178 (1987a); Webster: 114 (1994b); Radcliffe-Smith: 301 (1996); Stuppy *et al.*: 88 (1999).

Trees; indumentum simple; monoecious or subdioecious. **Leaves** alternate, simple, entire or palmately lobed, lobed leaves with gland at sinus between lobes, petiolate; stipules minute and soon deciduous. **Inflorescences** terminal, thyrsiform, bisexual, protogynous, with a solitary, terminal female flower and several male flowers and cymules, or else inflorescences unisexual; bracts lanceolate, lower sometimes persistent, upper soon deciduous; flowers large. **Male flowers**: calyx valvate, 2- or 3-lobed; petals free, contorted; disc of 5 free, erect glands; stamens 2-verticellate, (8–)10–14, outer ± free or fused for a third of their length, inner fused for over half their length; anthers introrse; pistillode 0. **Female flowers**: calyx, petals and disc as in male flowers; ovary 3(–5)-locular, with 1 ovule per locule; styles 3(–5), ± free or united at base, bifid. **Fruit** large, tardily dehiscent from base; exocarp fibrous; endocarp woody or crustaceous, 3(–5)-locular. **Seeds** ovoid-trigonous, ecarunculate; testa thick, woody; albumen hard; embryo straight; cotyledons broad, flat. $x = 11$.

Species 3 from East and Southeast Asia, of which 2 are cultivated in sthn Afr. and may occur as escapes.

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Fabaceae (Leguminosae)

(Rosidae—Fabales)

Compiled by G. Germishuizen

Trees, shrubs, climbers, lianes or herbs. **Leaves** usually alternate, often pinnate or pinnately 3-foliolate or digitately compound, occasionally 1-foliolate; stipules usually present, various. **Inflorescence** a spike, raceme, panicle or head. **Flowers** various, usually bracteate, regular or irregular, mostly bisexual. **Sepals** in regular flowers (3)4–5(6), connate or free, in irregular flowers (4)5, free or connate into a toothed or lobed calyx. **Petals** connate or free, in regular flowers as many as sepals, in irregular flowers 5 or fewer by abortion. **Stamens** twice as many as petals, sometimes more, rarely as many as or fewer than number of petals; filaments free or variously connate; anthers 2-thecous, generally opening by longitudinal slits. **Ovary** almost always superior, 1-locular, 1–many-ovuled; style and stigma simple. **Fruit** generally a 2-valved, dehiscent pod, rarely fleshy and sometimes indehiscent and occasionally breaking into segments. **Seeds** various, without or with very little endosperm.

Genera 650, species ± 18 000; sthn Africa: genera 149, species ± 1705; economically important family.

Harvey: 1 (1862); Brenan: 1 (1959); Hutchinson: 221 (1964); Brenan: 1 (1967); Schreiber: 1 (1967a); Schreiber: 1 (1967b); Schreiber: 1 (1970); Gillett, Polhill & Verdcourt: 1 (1971); Ross: 1 (1975); Ross: 1 (1977); Polhill: 191 (1981b).

One of the principles followed in this work is to maintain uniformity of treatment, where practicable, with the Floras of neighbouring territories. The case of the Fabaceae (Leguminosae) leaves one in a dilemma. Hutchinson (1964) and others prefer to treat Caesalpiniaceae, Mimosaceae and Fabaceae (Papilionaceae) as separate families. Brenan (1967), who maintains Leguminosae, summarises the position in the following words: 'Although some authors consider the three subfamilies of Leguminosae as separate families, this really represents no more than a slight difference of opinion. If emphasis is laid on the borderline tribes mentioned, then subfamily is the reasonable rank; if, on the other hand, these are discounted in favour of the numerically much larger mass of genera about whose position there is no room for doubt or difference of opinion, then the subfamilies are reasonably considered as families. The three groups, however, remain very much the same in content, whatever taxonomic rank is assigned to them'.

In this work I have used Fabaceae, an alternate name for Leguminosae, with Mimosoideae, Caesalpinioideae and Papilionoideae as subfamilies. The following keys to the subfamilies, groups and genera are based very largely on the publications of Dyer (1975), Ross (1975, 1977), Polhill (1981a) and Polhill & Raven (1981).

Key to subfamilies

1a Flowers regular; petals valvate in bud, often united basally; sepals usually united basally; stamens as many as petals or twice as many or numerous, free or all united into a tube or to the base of the petals; anthers uniform, dehiscing lengthwise, sometimes with a deciduous gland at the apex; leaves bipinnate or, rarely, pinnate in indigenous species#; seeds normally with an areole on each face or side ..... **Mimosoideae** (p. 263)

1b Flowers nearly always irregular; petals imbricate in bud, free or some of them united; seeds usually without an areole:

2a Adaxial (uppermost) petal overlapped on each side by the adjacent lateral petals (when present); sepals often free; stamens 10 or fewer, free or, less often, variously united; anthers uniform, rarely dimorphic, dehiscing lengthwise or by terminal pores; leaves mostly pinnate or bipinnate, rarely simple or 1-foliolate; seeds with radicle usually straight ..... **Caesalpinioideae** (p. 264)

2b Adaxial (uppermost) petal outside the adjacent lateral petals or wings and usually forming with the keel-petals an irregular corolla; sepals united basally; stamens 10 or rarely fewer, rarely free, most often the adaxial ones free or nearly so and the other 9 united, sometimes united into 2 groups of 5 or all united; anthers mostly dehiscing lengthwise; leaves very rarely bipinnate (*Rhynchosia*); seeds with radicle usually curved ..... **Papilionoideae** (p. 266)

Some exotic species of *Acacia* growing in our flora area have phyllodes which may appear to be simple leaves.

Subfamily **Mimosoideae** (Mimosaceae)

Trees, shrubs, or rarely herbs, often armed with prickles or spines. **Leaves** bipinnate or rarely once-pinnate; stipules present, sometimes spinescent. **Flowers** regular, bisexual, unisexual, or some neuter and sterile, small and short or sometimes elongated and tubular, (3)5(6)-merous, usually sessile in cylindric spikes or globose heads, rarely racemose or in globose umbels; bracts small, often caducous; bracteoles rarely present. **Sepals** imbricate or valvate, connate into a toothed or lobed limb, rarely free. **Petals** valvate, free or connate into a lobed corolla, hypogynous or slightly perigynous. **Disc** usually 0. **Stamens** 4–10 (as many as or twice as many as petals), free or monadelphous or adnate to base of corolla tube; anthers small, versatile, often crowned by a deciduous gland, dehiscing lengthwise. **Ovary** free at base of calyx tube, 1-locular; style usually filiform; stigma small, terminal; ovules mostly many. **Pod** dehiscent or indehiscent, sometimes breaking into 1-seeded segments. **Seeds** mostly ovate or orbicular, compressed, sometimes winged, hilum basal, rarely thick, globose or ovoid; aril rarely present, testa hard, endosperm none or thin; cotyledons flat; radicle straight.

Key to genera

1a Plant armed with prickles or spines:
2a Inflorescence bicoloured, the upper part bisexual, yellow, the lower neuter, mauve, pink or white; short lateral branches terminating in spines, plants otherwise unarmed ..... **Dichrostachys**
2b Inflorescence concolorous; plants armed with recurved prickles or stipular spines, very rarely short lateral branchlets terminating in spines:
3a Plant armed with recurved prickles or stipular spines, spine-tipped lateral branchlets 0:
4a Flowers in globose or subglobose heads, rarely the inflorescence reduced to only 2–4 flowers per 'head':
5a Stamens as many as or twice as many as the (3)4–5(6) corolla lobes:
6a Small rigid much-branched shrub with pale green to olive, cano-puberulous, substriate branches; stipules spinescent, recurved, up to 3.5 mm long; leaves small, each with 1 pinna pair; stamens 10, the 5 opposite the petals shorter than those alternating with the petals; anthers with a minute deciduous apical gland ..... **Xerocladia**
6b Annual or perennial herb or small shrub; stems armed with scattered prickles and usually densely hispid or setulose; stipules not spinescent, persistent; leaves sensitive to touch, with (1)2–14 pinnate pairs; stamens 4 or 8; anthers eglandular apically; flowers pink or mauve ..... **Mimosa**
5b Stamens many (± 35–200):
7a Inflorescence reduced to 2–4 flowers; flowers pink; filaments shortly united into a tube, basally..... **Calliandra**
7b Inflorescence not as above; flowers mostly white, yellowish white, bright or deep yellow; filaments free ..... **Acacia**
4b Flowers in spikes or spiciform racemes:
8a Stamens 10:
9a Recurved prickles scattered along the stem; pods compressed, slightly curved to falcate, at maturity the valves splitting transversely into 1-seeded segments ..... **Adenopodia**
9b Straight stipular paired spines; pods slightly curved or coiled, indehiscent, not segmented..... ***Prosopis**
8b Stamens many (± 35–200):
10a Petioles glandular; stamen filaments free; pods mostly dehiscent, various ..... **Acacia**
10b Petioles eglandular; stamen filaments shortly connate basally; pods indehiscent, falcate or spirally coiled..... **Faidherbia**
3b Plant armed with spine-tipped lateral shoots, recurved prickles and stipular spines 0; inflorescence globose; stamen filaments united basally into a tube ..... **Albizia**
1b Plant unarmed:
11a Inflorescence capitate, globose or subglobose:
12a Aquatic herb with creeping, usually floating and swollen stems; flowers of two sorts, bisexual in upper part of head, neuter with elongate staminodes in lower part ..... **Neptunia**
12b Tree, shrub or suffrutex, rarely herbaceous and then not aquatic:
13a Leaves reduced to simple, entire phyllodes ..... **Acacia**
13b Leaves bipinnate:
14a Stamens 10:
15a Leaves with 1 pinna pair; leaflets large, 20–60 mm wide; large tree up to 15 m high ..... **Xylia**
15b Leaves with (2)3–8 pinnae pairs; leaflets small, less than 5 mm wide; perennial herb, suffrutex, shrub or small tree:
16a Anthers with conspicuous scattered hairs; flowers in heads up to 18 mm in diameter; shrub or small tree with densely grey-puberulous branchlets; leaflets 1.5–4.0 mm wide..... ***Leucaena**
16b Anthers glabrous; flowers in heads up to 8 mm in diameter; perennial herb or suffrutex with subglabrous to sparingly puberulous, ± angular stems; leaflets 0.8–1.5 mm wide..... **Desmanthus**
14b Stamens many to numerous (± 19–200):
17a Stamen filaments free; central flower of inflorescence not different from the rest ..... **Acacia**
17b Stamen filaments united basally into a tube, tube included or exserted beyond the corolla; central flower of inflorescence usually differing from and often larger than the rest..... **Albizia**
11b Inflorescence elongate, spicate or racemose:
18a Leaflets alternate to subopposite, 7–19 mm wide, with petiolules 1.5–3.0 mm long..... **Amblygonocarpus**
18b Leaflets opposite, very rarely alternate but then sessile and less than 2 mm wide:
19a Stamens 10:
20a Leaf rachis with a gland at the junction of each pair of pinnae or the upper pairs; large tree ..... **Newtonia**

20b Leaf rachis eglandular; liane, climber, shrub, suffrutex or small tree:
21a Liane, climber or erect suffrutex, the latter with leaflets 7–20 mm wide ..... **Entada**
21b Suffrutex, shrub or small tree; leaflets less than 6.5 mm wide ..... **Elephantorrhiza**
19b Stamens many to numerous (± 19–200):
22a Stamen filaments free ..... **Acacia**
22b Stamen filaments united basally into a tube, tube included or scarcely exserted beyond the corolla; flowers uniform ..... ***Paraserianthes**

Subfamily **Caesalpinioideae** (Caesalpiniaceae)

Trees, shrubs, sometimes climbers or lianes, or rarely herbs, unarmed or often armed. **Leaves** nearly always alternate, pinnate or bipinnate; with pinnae or leaflets in 1–many pairs, rarely leaves simple or 1-foliolate, sometimes gland-dotted; stipules paired, mostly caducous; stipels occasionally present and minute. **Flowers** irregular, rarely regular, usually 5-merous, mostly bisexual, some large and showy, others small, in axillary, terminal, or rarely leaf-opposed racemes, panicles or spikes. **Sepals** 5 or 4 by fusion of 2, free or partly united, imbricate or rarely valvate, often much reduced when the bracteoles are large and calyx-like and covering the bud. **Petals** 5 or fewer, rarely 0, the adaxial innermost, others variously imbricate. **Stamens** 10 or fewer, rarely many, free or variously connate; anthers various, usually dehiscing lengthwise, rarely by terminal pores, 2-locular; extra-staminal disc sometimes present. **Ovary** free or, when stalked, the stalk sometimes ± adnate to the calyx tube, of 1 carpel, 1-locular, with a ventral suture; style simple; ovules 1–many, superposed. **Pod** 2-valved, or indehiscent and drupaceous or samaroid. **Seeds** sometimes arillate, rarely with endosperm; cotyledons fleshy or foliaceous; radicle straight or rarely slightly oblique.

Key to genera

1a Leaves simple, emarginate apically to deeply bilobed, sometimes with a pair of leaflets:
2a Petals 0; leaves with a single pair of leaflets:
3a Stamens (8–)10(–12); inflorescence an axillary or terminal panicle; leaflets with a midrib and lateral nerves or without a midrib but with 3–6 conspicuous nerves arising from the base; pods pale yellowish brown, reniform, indehiscent; seeds with small sticky reddish resin glands ..... **Colophospermum**
3b Stamens 20–25; inflorescence a slender raceme or panicle; leaflets with 7–12 prominent nerves arising from the base, without a midrib; pods brown or reddish brown, obliquely semiorbicular, ovate or ovate-oblong, dehiscent or indehiscent; seeds not as above ..... **Guibourtia**
2b Petals 5; leaves emarginate apically to deeply bilobed, occasionally with a single pair of leaflets:
4a Plants with trailing or climbing, mostly herbaceous stems arising from a large underground tuber; tendrils usually present; fertile stamens 2, accompanied by staminodes; calyx with the 2 upper sepals partly or completely fused, the rest free ..... **Tylosema**
4b Plants growing as a shrub or small tree, seldom scandent or climbing but then woody and without tendrils:
5a Flowers normally unisexual and plants dioecious; female flowers with the stigma sessile on the ovary, capitate, flattened-globose; male flowers with 10 fertile stamens; calyx turbinate with 4 or 5 short broad lobes..... **Piliostigma**
5b Flowers bisexual; style elongate; fertile stamens 1–10; calyx spathaceous or campanulate with 5 short lobes or teeth:
6a Calyx spathaceous, splitting to the base down one side only, with the sepals fused or sometimes partly separated; fertile stamens 1–10, sometimes accompanied by staminodes; pods oblong or oblanceolate-oblong, valves thinly woody ..... **Bauhinia**
6b Calyx campanulate, with 5 short teeth or lobes; fertile stamens 10; plants often conspicuously glandular; pods semiorbicular, valves papery, with or without stalked glands ..... **Adenolobus**
1b Leaves pinnately or bipinnately compound with more than 2 leaflets, very seldom leaves reduced to green, ± terete, 'needle-like' pinna-rachillae with or without minute inconspicuous leaflets, or the rachillae laterally winged and appearing flattened, '± phyllodial', with many pairs of small leaflets:
7a Leaves reduced, the pinna-rachillae green, ± terete and 'needle-like', with or without minute inconspicuous leaflets, or the rachillae laterally winged and appearing flattened, '± phyllodial', with many pairs of leaflets up to 9 x 3 mm; plant armed with stout spines ..... **Parkinsonia**
7b Leaves not reduced, pinna-rachillae not 'needle-like' or '± phyllodial'; plant unarmed or armed with recurved prickles, rarely armed with spines:
8a Leaves bipinnate:
9a Plant unarmed:
10a Leaflets alternate; flowers small (petals 2–5 mm long, white to cream-coloured or pale green); sepals open from a very early stage, leaving the petals covering the flower until anthesis:
11a Flowers pedicellate; with narrow petals which are ± densely pubescent, at least on the margins; anthers 0.5–0.75 mm long; stigma minute, cup-shaped-punctiform on a narrow conical style; stamen filaments pubescent or tomentose to near the apex; hairs (when present) on vegetative buds and young branchlets grey-brown to yellowish ..... **Erythrophleum**
11b Flowers sessile; petals glabrous or almost so; anthers 1.5–2.0 mm long; style very short, ending in a funnel-shaped stigma slit down one side; stamen filaments glabrous; hairs on vegetative buds, young branchlets and inflorescence axes rusty red ..... **Burkea**
10b Leaflets opposite; flowers usually medium to large (petals 7–32 mm long, seldom smaller, yellow, orange, red or magenta); sepals valvate or imbricate:
12a Leaves imparipinnate; herb or low shrub up to 0.5 m high; stems, leaves and calyces with many dark sessile glands; petals up to 9 mm long ..... **Hoffmannseggia**

12b Leaves paripinnate; tree or large shrub; petals 7–32 mm long:

13a Stigma broadly peltate; inflorescence axes, calyces and ovaries rusty tomentose; petals yellow; stipules up to 14 mm long, linear-subulate with up to 7 linear, alternate lateral appendages up to 6 mm long..... **Peltophorum**

13b Stigma not broadly peltate; inflorescence axes, calyces and ovaries not rusty tomentose; petals yellow, pink, red or magenta; stipules not as above ..... **Caesalpinia**

9b Plant armed with prickles or spines:

14a Calyx lobes valvate; flowers small, greenish to white; spines usually branched ..... ***Gleditsia**

14b Calyx lobes or teeth imbricate; flowers yellow, pale yellowish white, pink, red or magenta; spines not branched:

15a Petals 2–3 mm long; pods samaroid, with a basal seed-containing portion whose upper suture is greatly extended beyond the seed-containing part and is broadly winged on its lower side..... **Pterolobium**

15b Petals 6–25 mm long; pods unwinged ..... **Caesalpinia**

8b Leaves simply pinnate:

16a Plants armed with spines:

17a Leaves with 3 pairs of opposite leaflets; inflorescence a relatively few-flowered lateral or terminal raceme; petals yellow, 8–10 x 5–7 mm; ovary glandular ..... **Haematoxylum**

17b Leaves with (3–)5–10(–12) pairs of subopposite or irregularly alternate leaflets; inflorescence a short, lax panicle or many-flowered, drooping raceme; petals greenish or white; ovary eglandular:

18a Inflorescence a lax panicle; pods 30–50 mm long, 9–12 mm wide, straight or almost so, dehiscent ..... **Umtiza**

18b Inflorescence a dense drooping raceme; pods large, 150–300 mm long, 25–35 mm wide, usually slightly falcate but often twisting with age, indehiscent ..... ***Gleditsia**

16b Plant unarmed:

19a Bracteoles paired, valvate throughout, well developed, completely enclosing the flower bud, usually persistent:

20a Bracteoles enclosing the young flower bud but soon caducous, exposing the bud enclosed by the calyx; stamen- and staminode filaments all united basally for ± half their length; fertile stamens 3, alternating with 5 sterile teeth or short filaments; larger petals 3, subequal, gold with red veins..... **Tamarindus**

20b Bracteoles enclosing the young flower bud and persistent below the open flower; stamens not as above and more than 3 fertile; petals or tepals not coloured as above:

21a Perianth clearly differentiated into 5 obvious petals and 5 sepals..... **Julbernardia**

21b Perianth 0 or of 1–7(–11) parts, usually 4–7 all sepaloid and of similar form, grading inwards from broader to narrower ..... **Brachystegia**

19b Bracteoles nonvalvate, often scale-like, often caducous or 0, seldom enclosing the flower bud, but, if so, then one or both margins of one bracteole overlapping the other, at least at the base, and the flower with only 1 petal:

22a Petals 0 or sometimes petals present but reduced to minute, linear, inconspicuous filaments and apparently absent:

23a Stamens 10, filaments united basally for 1.5–3.5 mm, tube entire or split down one side; calyx leathery, 4-(rarely 5-)lobed, red or scarlet, glabrous or sparingly puberulous; ovary glabrous; inflorescence a dense, congested, subglobose panicle, usually cauliflorous on older branches but occasionally terminal... ..... **Schotia**

23b Stamens 5–10, filaments free; sepals 5, fulvous or rusty brown puberulous outside; ovary densely ferruginous-hirsute; inflorescence a many-flowered panicle or raceme:

24a Inflorescence a many-flowered panicle; ovules 2; pod ovoid-ellipsoid, densely brown velutinous-puberulous ..... **Dialium**

24b Inflorescence a dense raceme; ovules many; pod elongated, compressed, thick and coriaceous, glabrous ..... ***Ceratonia**

22b Petals 1–5, well developed:

25a Petals 1–4:

26a Petals 1, pubescent and green outside, dark red inside, 25–45 mm long, with a long claw suddenly widening into a deeply bilobed lamina 22–31 mm wide; fertile stamens usually 7 (rarely 9) ..... **Afzelia**

26b Petals 1–4, pale pink or red throughout, smaller than above and not widened above into a deeply bilobed lamina; fertile stamens 10 ..... **Schotia**

25b Petals 5:

27a Anthers opening by terminal or basal pores or short slits, usually basifixed; petals mostly yellow; glands often present on petiole or leaf rachis:

28a Filaments of the 3 adaxial stamens sigmoidally incurved, many times longer than their small anther; filaments of other stamens straight, shorter, the anthers dehiscing by basal pores; pedicels 2-bracteolate at or just above their base; pod elongate, usually cylindric, indehiscent; seed coat smooth, without areoles; tree ..... **Cassia**

28b Filaments of all stamens straight, either shorter or not more than twice as long as their anthers; if longer, then the anthers dehiscing by apical pores; pods various, but if cylindric and indehiscent then the pedicels without bracts:

29a Bracteoles 0; pod either indehiscent, or breaking inelastically through one or both sutures; if through both, then the valves not coiling; androecium often irregular, the members tending to decrease in size from the abaxial to the adaxial side of the flower; anther thecae naked along the sutures; seed coat often with a closed areole on each face or margins; tree, shrub or herb..... **Senna**

29b Bracteoles 2; pod elastically indehiscent, the valves coiling at or after dehiscence; androecium virtually regular, the two cycles sometimes of different lengths but not decreasing regularly from

abaxial to adaxial side of the flower; anther thecae ciliolate along the sutures; seed-coat without areoles; usually a herb ..... **Chamaecrista**

27b Anthers opening by longitudinal slits which are as long as the anther, usually dorsifixed; petals pink, red, mauve, magenta or sometimes yellow; conspicuous glands not present on petiole or rachis:

30a Petals yellow; small shrub to 2 m high; leaves up 12 mm long with 3 pairs of obcordate or broadly obovate to obovate-suborbicular leaflets ..... **Haematoxylum**

30b Petals pink, red, mauve or magenta; large shrub or tree; leaves much larger than above:

31a Inflorescence a short raceme or panicle; calyx glabrous or almost so; petals pink, red or scarlet; ovary glabrous or almost so ..... **Schotia**

31b Inflorescence a stout raceme up to 350 mm long; sepals densely fulvous-tomentose outside; petals pink, mauve or magenta; ovary fulvous-tomentose ..... **Baikiaea**

Subfamily **Papilionoideae** (Papilionaceae)

Lianes, mostly herbs, shrubs, or trees, unarmed or, less often, spiny. **Leaves** pinnate or pinnately 3-foliolate, less often digitately 3-foliolate, occasionally 1-foliolate, simple or palmate; stipels sometimes present. **Flowers** irregular, mostly bisexual, solitary, racemose or paniculate, less often umbellate, spicate or capitate. **Sepals** usually 5, ± connate into a tube. **Petals** 5, imbricate, free, the upper (adaxial) exterior and forming the standard or vexillum, the two lateral (wings) ± parallel with each other, the lowest two interior and connate by their lower margins into a keel or carina. **Stamens** arising from base of petals, often 10, monadelphous or diadelphous, mostly all perfect; anthers mostly opening lengthwise, basifixed or dorsifixed. **Fruit** usually a legume (pod) or indehiscent, sometimes jointed and breaking into 1-seeded segments.

Key to tribes

1a Filaments all free from base upwards, occasionally shortly and ± equally connate at base only; anthers usually uniform in size and shape:

2a Calyx entire in bud; stamens 9–numerous; petals 0–9, not much differentiated ..... **Swartzieae** (p. 273)

2b Calyx lobes apparent or corolla markedly papilionoid; stamens (5–)10(–30); petals generally 5; rarely 1 or 0:

3a Leaves pinnately foliolate or of only 1 leaflet and then with distinct pulvinus at apex of petiolule ..... **Sophoreae** (p. 273)

3b Leaves digitately foliolate or simple, very rarely pinnate or reduced to scales ..... **Podalyrieae** (p. 272)

1b Filaments partly or almost wholly united to one another, either monadelphous in a closed tube, or diadelphous with the vexillary (adaxial) filament often free or partly so:

4a Anthers distinctly dimorphic, alternately basifixed and shorter dorsifixed; leaves simple, 1-foliolate or digitately 3(–many)-foliolate, if compound, leaves generally pulvinate or with a raised leaf base, rarely distichous, never glandular-punctate; fruit never jointed:

5a Upper 2 calyx lobes joined higher than lower ones, sometimes enlarged; lowermost (carinal) calyx lobe generally longer or narrower than upper ones; flowers mostly in heads or clusters; style glabrous; seeds arillate ..... **Liparieae** (p. 270)

5b Calyx lobes variously united, but not as above, or subequally lobed; lowermost lobe often much shorter and narrower than upper ones; flowers in terminal, rarely leaf-opposed, spikes, racemes, or heads, rarely axillary; seeds rarely arillate:

6a Filaments fused into a sheath open on upper side ..... **Crotalarieae** (p. 268)

6b Filaments fused into a closed tube ..... **Genisteae** (p. 270)

4b Anthers ± uniform at least in size, some sometimes aborted, or if dimorphic (in Aeschynomeneae, Psoraleeae and a few Phaseoleae, by abortion in *Teramnus*) then leaves pinnate or glandular punctate:

7a Leaves with pulvinus 0 (stipules often adnate to petiole base) or reduced, often with a stipular ridge forming an abaxial commissure, generally distichous or crowded; inflorescence axillary; herb or small softly woody shrub:

8a Leaflets ± toothed; nerves extending to ± toothed margin of leaflets; stipules adnate to petiole base ..... **Trifolieae** (p. 274)

8b Leaves not toothed (except some Psoraleeae); nerves looped within the margin (except some Galegeae):

9a Leaves generally paripinnate, ending in a tendril or bristle, rarely imparipinnate; stipules free from petiole, generally foliaceous; fruit 2-valved; seeds lenticular to globose with ± linear hilum and no radicular lobes; herb ..... **Vicieae** (p. 274)

9b Leaves generally ending in a leaflet or a spine, less often in a bristle; stipules generally small and/or adnate to the petiole; seeds with a small round hilum generally below a radicular lobe:

10a Filaments of all or alternate stamens dilated apically; flowers 1 or 2 from axils, in heads or more often umbellate, sometimes subtended by a foliar bract; compound leaves generally with at least 3 terminal leaflets conjugate, lowermost pair sometimes stipule-like, sometimes with a glandular stipule:

11a Fruit not jointed, generally dehiscent if long-exserted ..... **Loteae** (p. 271)

11b Fruit jointed or elongated with thickened margins and hooked tip ..... **Coronilleae** (p. 268)

10b Filaments not dilated upwards:

12a Ovule 1; fruit 1-seeded, glandular; inflorescences compound, with more than 1 series of bracts; foliage ± glandular-punctate or pustulate ..... **Psoraleeae** (p. 273)

12b Ovules 2–many; fruit not both 1-seeded and glandular; racemes or fascicles simple with flower bracts only ..... **Galegeae** (p. 269)

7b Leaves pulvinate, mostly free from stipules if present:

13a Petals 5, all similar, ribbon-like or spathulate; fruit drupaceous or flat and curved, eglandular 1(–2)-seeded, indehiscent ..... **Dalbergieae** (p. 269)

13b Petals differentiated, papilionoid:

14a Stamens 9; leaves paripinnate; flowers in pseudoracemes (pedicels several at a rachis node) or axillary fascicles; pods elastically dehiscent, with brown to brightly coloured seeds ..... **Abreae** (below)

14b Not as above:

15a Anthers apiculate or appendaged; petals usually reddish and caducous; biramous hairs present (often among others); normally leafy ..... **Indigofereae** (p. 270)

15b Anthers not appendaged (if petals caducous):

16a Anther thecae confluent above; perennial herb with astragaloid flowers, ± glandular foliage and minute peltate scales; fruit several-seeded, dehiscent or not, often muricate or bristly ..... **Galegeae** (subtribe **Glycyrrhizinae**) (p. 270)

16b Anther thecae separate, sometimes reduced to terminal pores (then plant woody):

17a Fruit 1-seeded, often nutlet-like, small, generally glandular, with marcesent calyx; foliage glandular-pustulate or -punctate; never twining or large tree; inflorescence axillary; leaves (1–)3(–5)-foliolate ..... **Psoraleeae** (p. 273)

17b Fruit more pod-like, eglandular or woody; glands, if present, generally on surface or small internal punctae:

18a Fruit transversely jointed, sometimes of only 1 article, or less often opening down one suture (then tertiary venation of leaflets scalariform); seeds with radicular lobe longer than cotyledonary lobe; lower petals generally withering and caducous after explosive pollen release; inflorescence generally compound with more than 1 series of bracts; leaves pinnately 3(–11)-foliolate, generally stipellate; stipules and bracts often striately nerved ..... **Desmodieae** (p. 269)

18b Fruit not jointed, or if so (Aeschynomeneae), seeds more symmetrical; lower petals more retractible or little interconnected and differentiated:

19a Style straight or curved away from standard; standard with a median gutter; leaves digitately 3-foliolate ..... **Crotalarieae** (p. 268)

19b Style curved towards standard:

20a Hypanthium 0; intrastaminal disc generally present; vexillary filament often connate medially, but free, arched and thickened to form openings at base; flowers generally in pseudoracemes, sometimes in extensive panicles or clustered in axils; leaves generally imparipinnate, 3–many-foliolate, leaflets generally strictly opposite and stipellate, occasionally alternate, sometimes 1-foliolate or simple:

21a Leaves 1–many-foliolate, if 3-foliolate the lateral leaflets only slightly asymmetrical; tree, shrub or liane with hard wood, less often a subshrub or herb (*Tephrosia* generally have closely parallel nerves extending to leaflet margins, but easily confused with Phaseoleae subtribe Ophrestiinae); inflorescences aggregated towards branch ends ..... **Tephrosieae** (p. 273)

21b Leaves (1–)3-foliolate, the laterals usually markedly asymmetrical and regularly stipellate, occasionally 5–9-foliolate; twining prostrate or erect herb, sometimes a shrub, liane or tree; inflorescences often in many axils ..... **Phaseoleae** (p. 271)

20b Hypanthium present, short to long; intrastaminal disc generally lacking; vexillary filament not flared at base of staminal tube; flowers almost always arising singly if inflorescence extended; leaves variously paripinnate to imparipinnate; leaflets alternate to opposite, with or without stipels, sometimes 1–3-foliolate:

22a Fruit jointed or geocarpic ..... **Aeschynomeneae** (below)

22b Fruit not jointed, nor geocarpic:

23a Ovules 1–4; fruit indehiscent, the seeds generally in separate seed chambers with hard endocarp; keel petals generally overlapping abaxially or, if margins adnate, flowers usually secund on the rachis, ± free from wings; stamens often shortly and/or irregularly joined ..... **Dalbergieae** (p. 269)

23b Ovules generally more numerous; fruit generally more pod-like even if flat and indehiscent:

24a Flowers in axillary racemes (occasionally with 1 or 2 branches if on leafless shoots) or rarely strictly leaf-opposed or in axillary clusters; stamens three-quarters joined except some bird-flowers; keel petals abaxially joined (shortly in some bird-flowers); pods usually dehiscent, often septate internally ..... **Robinieae** (p. 273)

24b Flowers in terminal panicles, sometimes with supplementary axillary racemes, rarely all axillary; stamens very rarely joined so high and keel petals usually overlapping abaxially; fruit generally indehiscent ..... **Sophoreae** (p. 273) and **Tephrosieae** (p. 273)

Tribe **Abreae**

Only one genus in tribe ..... **Abrus**

Tribe **Aeschynomeneae**

Key to subtribes

1a Conspicuous pellucid or pustular glands on leaves, calyx, etc. or, if obscure, flowers sessile in many paired bracts; pedicels without joints or bracteoles; fruit without strong longitudinal nerves on sides; articles several, quadrate, often ornamented with glands, crests or bristles ..... **Poiretiinae** (p. 268)

1b Pellucid or pustular glands lacking; pedicels almost always articulate and/or bracteolate:

2a Flowers pedicellate; receptacle broader than long or 0; ovary generally stipitate:

3a Leaves almost always imparipinnate; fruit (unless globular or covered by bristles) with strong continuous nerves on sides; ovary septa formed late; 3 lower calyx lobes discrete; stamens variously united but tending to split on vexillary side first, deflexed after anthesis ..... **Ormocarpinae** (below)

3b Leaves paripinnate, subimparipinnate or occasionally imparipinnate; articles reticulately veined; ovary septa generally formed by anthesis; 3 lower calyx lobes discrete or largely joined in a lip; stamens tending to split on carinal side first, usally 10 or 5 + 5, usually lying above the fruit ..... **Aeschynomeninae** (below)

2b Flowers sessile or subsessile in axils or on a common axis (bracts and 2 bracteoles then adjacent); receptacle longer than broad, sometimes tubular; ovary sessile or nearly so; fruit with strong continuous longitudinal nerves on sides.... ..... **Stylosanthinae** (below)

Subtribe **Aeschynomeninae**

Key to genera

1a Fruit exserted from the calyx ..... **Aeschynomene**

1b Fruit enclosed within the calyx:

2a Stipules spurred at base; spur bilobed, with one side linear and longer than the other; leaflets opposite, 1-nerved ..... **Smithia**

2b Stipules not spurred at base; leaflets alternate, with 2–7 basal nerves ..... **Kotschya**

Subtribe **Ormocarpinae**

Only one genus represented ..... **Ormocarpum**

Subtribe **Poiretiinae**

Only one genus represented ..... **Zornia**

Subtribe **Stylosanthinae**

Key to genera

Leaflets 3; fruit not maturing below the soil; petals arising in throat of calyx tube ..... **Stylosanthes**

Leaflets 2 or 4; fruit maturing below the soil, reticulate; petals and stamens arising at the apex of the calyx tube ..... ***Arachis**

Tribe **Coronilleae**

Only one genus represented ..... ***Ornithopus**

Tribe **Crotalarieae**

Key to genera

1a Stipules 0 or inconspicuous; anthers often dimorphic:

2a Leaves simple:

3a Calyx lobes unequal, the lower smaller and narrower than the upper; leaves usually with 1 main nerve and several lateral nerves:

4a Fruit lanceolate or linear; a shrub or shrublet, ± glabrous and often glaucous; leaves from orbicular to linear, sessile or subsessile ..... **Rafnia**

4b Fruit ovate, turgid; perennial herb, villous; stems prostrate from a woody rootstock; leaves lanceolate ..... **Lotononis**

3b Calyx lobes subequal; leaves with 3–several parallel nerves; vexillum villous; fruit linear, compressed; shrub or shrublet, glabrous or sparsely villous ..... **Aspalathus**

2b Leaves compound, rarely reduced to a single leaflet:

5a Calyx ± regularly 5-toothed:

6a Fruit linear; leaves petiolate, 3-foliolate or simple or reduced to scales ..... **Lebeckia**

6b Fruit semi-ovate or lanceolate, obliquely acute or obliquely rhomboid; leaves in threes or fascicles, not petiolate.... ..... **Aspalathus**

5b Calyx not regularly 5-toothed:

7a Calyx with 4 upper lobes ± united in pairs, the lowest free; anthers dimorphic:

8a Keel and style curved; mostly a shrublet ..... **Lotononis**

8b Keel and style straight; mostly a herb ..... **Pearsonia**

7b Calyx 2-lipped:

9a Calyx with trifid lower lip (lateral sinuses deeper than the lower ones); fruit subtorulose, linear, flat; keel longer than the vexillum ..... **Dichilus**

9b Calyx without trifid lower lip (lateral sinuses may be wider than the lower ones, but not deeper); fruit winged along the upper or both sutures, flat and indehiscent, ovate or oblong ..... **Wiborgia**

1a Stipules conspicuous, free from each other and from leaf:

10a Stipules fused with the petiole and forming a cylindrical sheath around the stem ..... **Polhillia**

10b Stipules not sheathing the stem:

11a Calyx equally 5-toothed or -lobed:

12a Anthers uniform, all bearing anthers; leaves digitately 3-foliolate or only the upper 1-foliolate ..... **Rothia**
12b Anthers alternately longer (basifixed) and shorter (dorsifixed):
13a Stipules small; flowers in terminal, often unilateral racemes; fruit linear ..... **Lebeckia**
13b Stipules conspicuous, sometimes foliaceous and toothed; peduncles leaf-opposed:
14a Beak of keel not spirally coiled ..... **Crotalaria**
14b Beak of keel and genitalia spirally coiled ..... **Bolusia**
11b Calyx not equally 5-toothed or -lobed:
15a Calyx with the 4 upper teeth ± united in pairs, the lower one free ..... **Lotononis**
15b Calyx bilabiate; anthers alternately dissimilar; fruit linear, compressed, often tortulose ..... **Melolobium**

Tribe **Dalbergieae**

Key to genera

Wing petals not much broader than keel, not crimped, white or cream-coloured; anthers basifixed, with apical dehiscence; some branches modified as spines or climbing aids ..... **Dalbergia**
Wing petals broadly expanded, ± crimped, bright yellow or orange-yellow; anthers dorsifixed with longitudinal dehiscence; branches not modified as spines or climbing aids ..... **Pterocarpus**

Tribe **Desmodieae**

Key to subtribes

Plants with characteristic uncinate hairs; tertiary venation ± scalariform; stipels present; flowers chasmogamous, with an explosively dehiscent pollination mechanism; vexillum with hardly or slightly inflexed auricles; ovary (1)–many-ovulate ..... **Desmodiinae** (below)
Plants without uncinate hairs; tertiary venation reticulate; stipels 0; flowers chasmogamous, not explosively dehiscent, often mixed with cleistogamous flowers; vexillum with inflexed auricles more persistent than most Desmodiinae; ovary 1-ovulate ..... **Lespedezinae** (below)

Subtribe **Desmodiinae**

Key to genera

1a Calyx often membranous, not glumaceous or striate, shallowly divided, usually inconspicuous in fruit; fruit mostly held away from erect; leaves (1)3(5)-foliolate:
2a Stipules stramineous, striate, erect or spreading but never sharply recurved and velutinous; fruit distinctly jointed, breaking up into individual articles ..... **Desmodium**
2b Stipules mostly sharply recurved, dark brown adaxially, silver-velutinous abaxially; fruit splitting into 2 valves ..... **Pseudarthria**
1b Calyx glumaceous, striate, deeply divided, persistent and often partially enclosing the fruit; fruit held erect, usually consisting of a number of 'stacked' terete or subterete articles; leaves 1-foliolate ..... **Alysicarpus**

Subtribe **Lespedezinae**

Only one genus represented ..... ***Lespedeza**

Tribe **Galegeae**

Key to subtribes

1a Style bearded (sometimes just a tuft of hairs below stigma on one side); claws of keel largely joined; pods generally inflated (sometimes bladdery), if compressed, generally membranous, with sutures intruding or not, but without a longitudinal septum ..... **Coluteinae** (p. 270)
1b Style glabrous, but stigma sometimes penicillate (short, uniform hairs all round); pods not as above:
2a Pod nerves transverse, confluent over middle part of valves, fine or inconspicuous; vexillary filament generally free; keel blades generally auriculate; leaflet nerves usually looped within the margin or inconspicuous .... **Astragalinae** (below)
2b Pod nerves oblique, closely parallel, raised at maturity, confluent towards placental margin; vexillary filament connate with others; keel blades not auriculate; leaflet nerves extending to margin ..... **Glycyrrhizinae** (p. 270)

Subtribe **Astragalinae**

Key to genera

Perennial herb; unarmed; leaflets many ..... **Astragalus**
Rigid much-branched shrub; armed with axillary spines; leaves 1-foliolate ..... ***Alhagi**

Subtribe **Coluteinae**

Key to genera

Style bearded with hairs on the upper (adaxial) face; fruit membranous-bladdery, inflated ..... **Sutherlandia**
Style bearded around the stigma; fruit membranous, slightly inflated or compressed ..... **Lessertia**

Subtribe **Glycyrrhizinae**

Only one genus represented ..... ***Glycyrrhiza**

Tribe **Genisteae**

Key to subtribes

Leaves 5–17-foliolate, palmate, or leaves simple and large (most over 30 × 10 mm); keel strongly beaked; wings generally adnate at apex ..... **Lupininae** (below)
Leaves 1–3-foliolate or leaves simple and smaller; keel obtuse, rarely slightly beaked; wings free at apex ..... **Genistinae** (below)

Subtribe **Genistinae**

Key to genera

1a Plant spiny ..... ***Ulex**
1b Plant not spiny:
  2a Leaves simple or 1-foliolate, sometimes very small:
    3a Calyx split to the base adaxially ..... ***Spartium**
    3b Calyx not split to the base ..... ***Cytisus**
  2b Leaves 3-foliolate:
    4a Calyx nearly as long as the keel; plant often herbaceous ..... **Argyrolobium**
    4b Calyx with short teeth and not as long as keel; plant always a shrub ..... ***Cytisus**

Subtribe **Lupininae**

Only one genus represented ..... ***Lupinus**

Tribe **Indigofereae**

Key to genera

1a Pods 3–5 mm wide, erect, longitudinally ridged; leaflets often dentate; vexillary (adaxial) stamen completely united with others into a closed tube; corolla darkly veined when dry ..... **Cyamopsis**
1b Pods less than 3 mm wide, erect, patent or reflexed, not as above; leaflets never dentate; vexillary (adaxial) stamen free from others or united with them only at base; corolla not darkly veined when dry:
  2a Keel (and usually dorsal surface of standard) hairy; upper margin of the keel with a fringe of hairs; standard mostly broad at the base, tapering suddenly to a short claw; keel with lateral spurs, not prolonged-rostrate at the apex... **Indigofera**
  2b Keel (and usually dorsal surface of standard) glabrous; standard narrow at the base, tapering gradually to the claw; keel with lateral pockets (spurs 0), often prolonged-rostrate at the apex:
    3a Style short, thick; stigma discoid; fruiting pedicels mostly over 2 mm long, ± patent; pods often held at ± a right angle; bracts persistent; inflorescence lax in bud ..... **Microcharis**
    3b Style narrow, tapering to an oblique or capitate stigma; fruiting pedicels rarely over 2 mm long, reflexed (as are pods); bracts caducous; inflorescence dense in bud ..... **Indigastrum**

Tribe **Liparieae**

Key to genera

1a Leaves digitately 3-foliolate; stamens in a closed tube; bracteoles present ..... **Hypocalyptus**
1b Leaves simple; stamens in an open sheath; bracteoles 0:
  2a Keel petals not laterally appendaged; flowers mostly yellow; anthers ± equal in length; flowers in terminal heads or clusters:
    3a Calyx lobes unequal, lowest petaloid and large; keel narrow, slightly falcate, with a forwardly directed beak; leaves completely sessile ..... **Liparia**
    3b Calyx lobes subequal, not petaloid; keel obtuse or with an upwardly directed beak; leaves with a short petiole ..... **Xiphotheca**
  2b Keel petals gibbous on one side or with spur; flowers small; anthers dimorphic:
    4a Vexillary stamen free; the joined part of the stamen usually longer than the free part ..... **Amphithalea**
    4b Vexillary stamen joined with others, the free part usually longer than the joined part ..... **Coelidium**

Tribe **Loteae**

Only one genus represented ..... **Lotus**

Tribe **Phaseoleae**

Key to subtribes

1a Leaflets and calyx generally with yellowish gland-dots; bracteoles 0; style slender below, hardened and a little thickened distally, glabrous; inflorescence not nodose ..... **Cajaninae** (below)

1b Leaflets and calyx eglandular:

2a Style with distinctive expansion, flattening, coiling or specialised hairs, or if rarely unbearded as well as terete then petals elaborate with appendages on standard and keel petals adaxially joined; hila usually covered with spongy tissue ..... **Phaseolinae** (p. 272)

2b Style generally terete and unbearded (sometimes a few hairs below the stigma), occasionally coiled in Erythrininae, sometimes bearded or flattened in Clitoriinae but then petals less complex; hila rarely covered with tissue:

3a Flowers generally resupinate; calyx naked inside; style narrow or expanded to naked, penicillate or bearded in distal part; petals often hairy; leaflets 3, 1 or 5–9, with minute hooked hairs ..... **Clitoriinae** (below)

3b Flowers not resupinate or, if so, then differing in other respects:

4a Standard silky hairy outside, rather small, without appendages inside; seeds smooth, with a prominent aril; inflorescence not or slightly nodose ..... **Ophrestiinae** (p. 272)

4b Standard glabrous, or if hairy then inflorescence generally nodose or flowers much modified:

5a Flowers mostly adapted to pollination by birds or bats, the petals generally unequal in length, the fertile parts loosely housed or exserted, sometimes with small bee-type flowers but then either style coiled or flowers in extensive panicles and pod samaroid ..... **Erythrininae** (below)

5b Flowers mostly adapted to pollination by bees or, if bird-flowers, then petals subequal in length:

6a Inflorescence generally nodose, occasionally paniculate or axillary and few-flowered; seeds diverse, with short to long hilum ..... **Diocleinae** (below)

6b Inflorescence not or scarcely nodose (sometimes branched in *Pueraria*); seeds smooth, granular or rough, with short hilum ..... **Glycininae** (p. 272)

Subtribe **Cajaninae**

Key to genera

1a Ovules 4 or more; arils often prominent:

2a Fruit ± compressed, acuminate, marked between the seeds with oblique, depressed lines ..... ***Cajanus**

2b Fruit turgid; without depressions ..... **Bolusafra**

1b Ovules 2, rarely 3; arils usually inconspicuous:

3a Calyx lobes not enlarged after flowering:

4a Fruit compressed; flowers usually several in racemes:

5a Stems usually twining or trailing; funicle of the seed attached in the middle of the hilum ..... **Rhynchosia**

5b Stems usually stiff and erect; funicle of the seed attached at the end of the linear hilum ..... **Eriosema**

4b Fruit turgid; leaves digitately 3-foliolate or 1-foliolate; flowers spicate-racemose or paniculate ..... **Flemingia**

3b Calyx lobes enlarged and membranous or scarious after flowering, the lowest largest; fruit falcate-ovate, enclosed by the calyx ..... **Rhynchosia**

Subtribe **Clitoriinae**

Only one genus represented ..... ***Clitoria**

Subtribe **Diocleinae**

Key to genera

Calyx not strongly 2-lipped; upper calyx lobes completely united (calyx appears 4-lobed); fruit narrowly linear, straight or curved, many-seeded; usually a herb or subshrub, prostrate, climbing or erect ..... **Galactia**

Calyx 2-lipped, the upper lip large, entire or 2-lobed, the lower lip small; fruit large, linear-oblong to oblong, usually with longitudinal ribs close to upper margin; usually a woody climber or liane ..... **Canavalia**

Subtribe **Erythrinae**

Key to genera

Carina shorter than vexillum; anthers uniform; fruit glabrescent, often moniliform; stipels glandular or, rarely, coriaceous; usually a tree or shrub ..... **Erythrina**

Carina exceeding vexillum; anthers alternately dorsifixed and basifixed, the shorter often bearded; fruit with indumentum of irritant hairs; stipels nonglandular; woody liane or climber ..... **Mucuna**

Subtribe **Glycininae**

Key to genera

1a Stamens alternately aborted; persistent style of the fruit turned up into a hook ..... **Teramnus**
1b Stamens all fertile; pod without a hook:
2a Claw of the wings and keel shorter than the blade; seeds usually with a rough surface; hilum often with a scarious flap; calyx lobes often distinct:
3a Vexillary stamen usually united with the others; flowers small, white; inflorescence lax, 20–150-flowered; upper calyx teeth united..... **Neonotonia**
3b Vexillary stamen free below but connate above with the rest; flowers usually purple; inflorescence elongate, with the groups of flowers arising from very conspicuous nodes; upper calyx teeth distinct..... ***Pueraria**
2b Claws of the wings and keel longer than the blade; seeds with a smooth surface without a scarious flap; calyx thin and glabrous on the inside, translucent; upper calyx lobes united..... **Dumasia**

Subtribe **Ophrestiinae**

Only one genus represented ..... **Ophrestia**

Subtribe **Phaseolinae**

Key to genera

1a Stigma lateral, oblique; style filiform, coiled with 3–5 or more revolutions ..... **Vigna**
1b Stigma terminal:
2a Stigma bilabiate; stamens monadelphous..... **Otoptera**
2b Stigma not bilabiate; adaxial stamen usually free:
3a Pollen grains tuberculate or spinulose, zonitriporate; style tenuous throughout or slightly widened above; standard with narrow, elongated appendages; wings very narrow, flowers mostly yellow or orange; ovary 3–9-ovulate..... **Macrotyloma**
3b Pollen grains not spinulose or, if somewhat granulate, then other characters not as above; flowers often shades of red, violet, purple or blue:
4a Style not narrowed into a thin waist:
5a Style conspicuously flattened throughout and blade-like, slightly less than at right angles to the ovary; staminal appendages 2:
6a Style 2-winged, glabrous; stigma ± penicillate; keel somewhat rounded ..... **Alistilus**
6b Style not winged, with a line of hairs along inner margin; stigma not penicillate; keel sharply angled in middle; pods usually verrucose along margins ..... **Lablab**
5b Style not conspicuously flattened throughout:
7a Style with apex flattened into a tenuous, spatulate portion, stigmatose along the terminal edge..... **Sphenostylis**
7b Style not flattened (except in *Dolichos junodii*):
8a Style strongly curved near base and apex in same direction, the middle part gently curved in opposite direction..... **Dipogon**
8b Style not so complicatedly curved:
9a Style with a distinct, bulging, eccentric callus at its junction with the ovary..... **Neorautanenia**
9b Style without prominent callus at junction with ovary; stigma terminal, usually ringed with hairs ..... **Dolichos**
4b Style of two parts, an upper, incrassated part and a basal, tenuous part:
10a Keel not so strongly curved; stigma terminal, scarcely penicillate; flowers on a nodulate rachis ..... **Dolichos**
10b Keel incurved through 180–360°; stigma terminal, penicillate, with simple or branched hairs; flowers in axillary fascicles, usually precocious..... **Decorsea**

Tribe **Podalyrieae**

Key to genera

1a Leaflets many; flowers in extended racemes..... **Virgilia**
1b Leaflets 1–3; flowers 1 or 2(–4):
2a Leaves digitately or palmately 3-foliolate; calyx lobes longer than tube, imbricate; flowers solitary, axillary; wings with a transverse fold; fruit oblong, compressed..... **Cyclopia**
2b Leaves simple or unifoliolate; calyx lobes longer than tube; flowers 1–2(3–4)-nate on axillary peduncles; wings with curved, linear claw; fruit ovoid or oblong:
3a Flowers purple, pink or white; style base glabrous..... **Podalyria**
3b Flowers yellow; style base pubescent..... **Stirtonanthus**

Tribe **Psoraleeae**

Key to genera

1a Flower pedicel subtended by a distinctive, lobed cupulum:
2a Calyx lobes covered with black stubby hairs on inner surface, tube prominently ribbed and encrusted with glands; internal secretory cavities present in leaflets ..... **Psoralea**
2b Calyx lobes not covered with black stubby hairs on inner surface, tube weakly ribbed and sparsely glandular; internal secretory cavities 0 in leaflets ..... **Hallia**
1b Flower pedicel never subtended by a distinctive, lobed cupulum:
3a Fruit ovoid, with conspicuous black glandular warts when mature ..... **Cullen**
3b Fruit never with black glandular warts ..... **Otholobium**

Tribe **Robinieae**

Key to genera

Hard-wooded tree and shrub; stipules spinescent, usually paired; seeds not in distinct compartments ..... ***Robinia**
Upright herb, rarely tall and subshrubby; stipules not spinescent; fruit septate ..... **Sesbania**

Tribe **Sophoreae**

Key to genera

1a Leaves with 2 or more leaflets:
2a Fruit or pod moniliform, stalked; flowers white, yellow or rarely blue-violet, in racemes or leafy panicles ..... **Sophora**
2b Fruit not moniliform:
3a Fruit broadly linear, ± winged or margined; flowers yellow ..... **Calpurnia**
3b Fruit not winged; flowers mainly blue and pink:
4a Vexillum much broader than other petals; racemes simple, pendulous; flowers blue; fruit linear to oblong, compressed ..... **Bolusanthus**
4b Vexillum only slightly broader than other petals; racemes paniculate; fruit stalked, drupe-like ..... **Xanthocercis**
1b Leaves reduced to 1 leaflet (unifoliolate); fruit linear or falcate ..... **Baphia**

Tribe **Swartzieae**

Key to genera

Petals 0; leaflets (7)11–28 per leaf, with many pellucid glands; stamen filaments confluent basally with the hypanthium (calyx tube) ..... **Cordyla**
Petals 1, large; leaflets (3)5–11 per leaf, without pellucid glands; stamen filaments free or nearly so; disc and hypanthium 0 (filaments arising around base of gynophore or ovary) ..... **Swartzia**

Tribe **Tephrosieae**

Key to genera

1a Herb or undershrub, never scandent:
2a Legume contorted, membranous, subindehiscent; leaves digitately foliolate; stipules small or 0; flowers 2 or 3 in leaf axils ..... **Ptycholobium**
2b Legume coriaceous or rigid:
3a Legume 2–few-seeded; leaves usually pinnately trifoliolate ..... **Tephrosia**
3b Legume 1-seeded; leaves unifoliolate; leaflet obcordate ..... **Requienia**
1b Robust shrub or tree, sometimes scandent:
4a Leaves imparipinnate; stipulate; leaflets opposite:
5a Leaflets stipellate ..... **Millettia**
5b Leaflets not stipellate:
6a Fruit winged along the upper or both sutures; calyx truncate or with very short or obsolete teeth ..... **Derris**
6b Fruit not winged, flat and compressed, membranous or coriaceous:
7a Flowers white, pink or purple, in dense panicles, with most flowers reaching maturity ..... **Lonchocarpus**
7b Flowers orange, in terminal pseudoracemes, with only one flower per node reaching maturity ..... **Tephrosia**
4b Leaves imparipinnate; stipulate; leaflets alternate or subopposite:
8a Fruit woody, soon dehiscent ..... **Craibia**
8b Fruit coriaceous or membranous, never woody, indehiscent or tardily dehiscent:
9a Wing petals adnate to keel:
10a Leaves sometimes only pinnately 3-foliolate or rarely 1-foliolate; fruit broadly ovate to linear-oblong ..... **Lonchocarpus**

10b Leaves with 6 pairs of leaflets, silvery pubescent; fruit linear ..... **Mundulea**
9b Wing petals free from keel; keel petals free from each other; flowers in terminal panicles; fruit margined with a wing on each side ..... **Xeroderris**

Tribe **Trifolieae**

Key to genera

1a Petals falling after flowering; filaments not dilated:
2a Flowers in heads or short racemes or rarely solitary:
3a Fruit straight or curved, mostly linear ..... **Trigonella**
3b Fruit mostly spirally coiled, scarcely dehiscent, mostly prickly ..... ***Medicago**
2b Flowers in slender racemes; ovules few; fruit indehiscent or tardily 2-valved ..... ***Melilotus**
1b Petals becoming dry and persistent after flowering; filaments mostly dilated upwards; fruit indehiscent ..... **Trifolium**

Tribe **Vicieae**

Only one genus represented ..... ***Vicia**

Abrus Adans. 3856000

(Papilionoideae—Abreae)
Adanson: 327 (1763); Harvey: 262 (1862); Breteler: 607 (1960); Verdcourt: 235 (1970a).

Shrubs or undershrubs, often twining. **Leaves** abruptly pinnate, with common petiole ending in a bristle; leaflets many-jugate, often small; stipules setaceous. **Flowers** in axillary racemes, or sometimes on short, leafless branches. **Calyx** with short tube and 5 small lobes; 2 upper lobes subconnate, tooth-like. **Petals**: vexillum ovate to round, glabrous, ± adnate to staminal tube below; wings with long claws; keel arcuate, longer and broader than wings, sometimes gibbous, long-clawed. **Stamens** 9, monadelphous; vexillary stamen 0; anthers uniform. **Ovary** subsessile, few- to many-ovuled; style short, incurved, with capitate stigma. **Pod** membranous or woody, oblong or linear, compressed, 2-valved, subseptate, glabrous or sometimes rugose and hairy. **Seeds** subglobose or oblong, shiny, sometimes red, with black base. $x = 11$ (aneuploids, polyploidy).

Species 17, cosmopolitan in tropical and subtropical regions; 2 in sthn Afr.: Namibia, Botswana, Mpumalanga, Swaziland into KwaZulu-Natal and the Eastern Cape near Komga.

Acacia Mill. 3446000

(Mimosoideae—Acacieae)
Miller: [25] (1754); Harvey: 279 (1862); Brenan: 49 (1959); Brenan: 53: (1970); Ross: 24 (1975); Ross: 22 (1979).

Trees or shrubs, sometimes scandent or climbing, rarely undershrubs, unarmed or thorny or spiny. **Leaves** bipinnate, with leaflets often small and many-jugate, or with petiole expanded in some Australian species into phyllodes, with glands often present on petiole; stipules spinescent, inconspicuous, or occasionally membranous. **Flowers** in heads, in axillary or terminal spikes, solitary, fascicled, or on panicled peduncles, often sessile, bisexual or sometimes unisexual with few bisexual. **Calyx** usually present, campanulate, usually (3)4- or 5-toothed or lobed; sepals rarely free. **Petals** (3)4 or 5, usually united, rarely free or 0. **Stamens** many, exserted, free or united at base. **Ovary** sessile or stalked, 2–many-ovuled; style filiform, with small, terminal stigma. **Pod** 2-valved or indehiscent, variable in shape. **Seeds** compressed, with filiform to fleshy funicle. $x = 13$ (aneuploids, high polyploidy).

Species ± 900, mostly tropical or subtropical, mainly in Africa and Australia; 46 indigenous in sthn Afr., widespread; several Australian species have become naturalised.

Adenolobus (Harv. ex Benth.) Torre & Hillc. 3528020

(Caesalpinioideae—Cercideae)
Torre & Hillcoat: 37 (1955); Torre & Hillcoat: 194 (1956); Schreiber: 4 (1967b); Brummitt & Ross: 400 (1976); Coetzer & Ross: 55 (1977).

Erect or prostrate shrubs or small trees, with greyish to white bark, glabrous or sparsely covered with stout, multicellular sessile glands. **Leaves** alternate, simple, small, sometimes borne on abbreviated lateral shoots, emarginate apically or shallowly bilobed, truncate to cordate basally; lobes obliquely obovate to semicircular, light to greyish green, petiolate; stipules narrowly triangular, acuminate. **Inflorescence** a short or elongate raceme or flowers borne on abbreviated lateral shoots. **Flowers** bisexual, irregular, medium to rather small. **Calyx** broadly campanulate, with 5 short teeth or lobes ± equal in size, persistent, covered in some instances with multicellular glands. **Petals** 5, obovate or elliptical to lanceolate, narrowed basally into a claw. **Stamens** 10, free, all functional, some longer than petals. **Ovary** stalked; stalk ± 20 mm long, not fused to calyx tube. **Pod** crescent-shaped to shortly and broadly falcate, rounded, membranous, glandular or eglandular, with several seeds. **Seeds** small. $x = 14$ (1 report).

Species 2, Africa, occurring in S Angola and sthn Afr.: Namibia, N Botswana and Northern Cape.

Adenopodia C.Presl 3468020

(Mimosoideae—Mimoseae)
Presl: 206 (1851); Brenan: 77 (1986).

Entada Adans.: 318 (1763) in part.

Lianes or sometimes erect shrubs or small trees, armed with scattered deflexed or hooked prickles usually present on branchlets, and often on leaf petioles and leaf and pinna rachides and, occasionally on pod sutures. **Leaves** bipinnate; petiole with a conspicuous gland above base; pinnae usually with many pairs of opposite leaflets, rarely leaflets few (1–2 pairs); rachides of pinnae not modified into tendrils. **Flowers** bisexual, sessile or subsessile, in often paniculately aggregated spikes. **Calyx** cupular, shallowly 5-lobed. **Petals** 5, connate, sometimes very shortly so at base, rarely free. **Stamens** 10; anthers glandular at apex, soon deciduous. **Ovary** pubescent, ± stipitate, or subsessile; style-tip narrowing to a small porate stigma. **Pod** straight or curved, flat, splitting transversely into 1-seeded segments but leaving a persistent replum. **Seeds** subcircular to obovate, compound, wingless, with a central aerole variable in shape.

Species ± 10, widespread and mainly tropical; 1 species: *Adenopodia spicata* (E.Mey.) C.Presl, in sthn Afr. from the Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal to the Eastern Cape.

Aeschynomene L. 3793000

(Papilionoideae—Aeschynomeneae—Aeschynomeninae)

Linnaeus: 713 (1753); Harvey: 225 (1862); Verdcourt: 364 (1971a); Verdcourt: 370 (1973).

Annual or perennial herbs, undershrubs, or shrubs. **Leaves** subimparipinnate; leaflets few to many; stipules slender. **Flowers** mostly yellow, often lined with purple, bracteate, usually axillary, solitary or racemose. **Calyx** subequally lobed or 2-lipped. **Petals**: vexillum shortly clawed or sessile, sometimes with 2 pockets at base; wings eared, clawed; keel various. **Stamens** monadelphous; staminal tube sometimes split into 2 groups of 5, rarely diadelphous; anthers uniform. **Ovary** stalked, 2–28-ovuled, sometimes pubescent, sometimes with hairs from papillose base; style incurved or falcate, with terminal stigma. **Pod** linear or elliptic, often constricted into 2–many segments; segments round, elliptic or rectangular, flat or slightly convex, smooth or tuberculate, mostly indehiscent. **Seeds** oblong, reniform or lunate, sometimes slightly beaked. $x = 10$ (polyploidy).

Species over 150, mainly Africa and South America in tropical and subtropical parts; ± 10 in sthn Afr.: Namibia, the four northern provinces to KwaZulu-Natal and the Eastern Cape border.

Afzelia Sm. 3509000

(Caesalpinioideae—Detarieae)

Smith: 221 (1798) name conserved; Brenan: 124 (1967); Ross: 40 (1977).

Unarmed evergreen or deciduous trees. **Leaves** paripinnate or rarely subimparipinnate; leaflets opposite or subopposite, few-jugate; stipules minute, their basal parts connate into a persistent intra-petiolar scale and their upper parts free and deciduous. **Inflorescence** simply racemose or of racemes grouped into panicles. **Flowers** bisexual, irregular, spirally arranged along inflorescence axes; bracteoles large, well developed, concavo-convex, almost completely concealing young flower buds, one bracteole overlapping the other by its margins, both bracteoles deciduous before flower opens. **Calyx** tube ± elongate; sepals 4, slightly unequal (2 outer, 2 inner), imbricate. **Petals** 1, developed, clawed, orbicular or reniform, sometimes 2-lobed; others small or 0. **Stamens** 3–8, free or shortly connate; anthers ovate; staminodes (0)2–4. **Ovary** stalked, with stalk adnate to calyx tube, many-ovuled; style with truncate or subcapitate stigma. **Pod** thick, woody or leathery, obliquely oblong, compressed, 2-valved or subindehiscent, with transverse septa between seeds. **Seeds** ovoid or ellipsoid, large, with a large, basal, brightly coloured, cup-like aril. $x = 12$.

Species ± 14, fairly cosmopolitan in tropical areas; 1 in sthn Afr.: *Afzelia quanzensis* Welw., Northern Province, Mpumalanga to N KwaZulu-Natal.

Albizia Durazz. 3443000

(Mimosoideae—Ingeae)

Durazzini: 11 (1772); Harvey: 284 (1862); Codd: 67 (1958); Brenan: 136 (1959); Brenan: 113 (1970); Ross: 7 (1975).

Shrubs or trees, unarmed. **Leaves** bipinnate, few to many-jugate, main nerve of pinnae usually unilateral; glands on petiole and pinnae somewhat conspicuous; stipules herbaceous, sometimes conspicuous, usually caducous. **Flowers** in pedunculate, globose heads, or cylindric spikes, bisexual or occasionally unisexual, with few bisexual mixed. **Calyx** with campanulate to subcylindric tube and (4)5 short lobes. **Corolla** funnel-shaped with tube as long as or longer than calyx and (4)5-lobed. **Stamens** many, united towards base much exserted, anthers peltate with thecae opening upwards. **Ovary** sessile or shortly stalked, oblong or linear-oblong, narrowed into filiform style, longer than stamens; ovules several. **Pod** flattened, straight, indehiscent or 2-valved, papyraceous to subcoriaceous. **Seeds** few to several, ovoid to orbicular, compressed with filiform funicle. $x = 13$ (high polyploidy).

Species ± 145, from Africa to Asia and Australia; 11 indigenous in sthn Afr.: Namibia, the four northern provinces, Swaziland and KwaZulu-Natal; 2 others naturalised.

*__Alhagi__ Gagnebin 3783000

(Papilionoideae—Galegeae—Astragalinae)

Gagnebin: 59 (1755); Adanson: 328 & 514 (1763); Harvey: 233 (1862); Hutchinson: 469 (1964); Henderson & Anderson: 174 (1966); Ball: 191 (1968).

Rigid, much-branched shrubs armed with sharp, straight, axillary spines. **Leaves** simple, usually small, entire; stipules minute, free. **Flowers** solitary or often few in axillary racemes, pink, red or purple; bracts very small; bracteoles none. **Calyx** campanulate, with 5 short, subequal teeth. **Petals**: vexillum obovate, shortly clawed; wings falcate-oblong, free; keel incurved, obtuse. **Stamens** diadelphous; vexillary stamen free, remainder connate; anthers uniform. **Ovary** subsessile, many-ovuled; style filiform, incurved, glabrous; stigma small, terminal. **Pod** linear, thick or subterete, smooth, indehiscent, strongly contracted between the seeds. **Seeds** 1–5, reniform. $x = 8$.

Species 3, in dry or maritime places from Mediterranean regions to Nepal; 1 in sthn Afr.: *Alhagi maurorum* Medik. (= *A. camelorum* Fisch.), has become naturalised in the Douglas area (Northern Cape) and in parts of the Oudtshoorn District of the Western Cape.

Alistilus N.E.Br. 3910010

(Papilionoideae—Phaseoleae—Phaseolinae)

Brown: 294 (1921); Verdcourt: 387, 409 (1970b).

Perennial herbs, climbing, procumbent or prostrate. **Leaves** pinnately 3-foliolate, long-petiolate, stipulate; leaflets ovate, terminal one 3-lobed, densely ciliate. **Flowers** magenta to pink, in axillary racemes on long peduncles, ebracteate. **Calyx** hairy, with campanulate tube, somewhat 2-lipped; upper lip entire, lower 3-lobed, with lobes shorter than tube. **Petals**: vexillum shortly bilobed, with inflexed auricles and 2 appendages on limb; wings eared, clawed; keel incurved, subsessile. **Stamens** diadelphous, with vexillary stamen adnate to others at middle and kneed at base; anthers uniform. **Ovary** linear, 4–8-ovuled, hairy; style strongly curved near base and apex in same direction, broadening from base upwards, with narrow, membranous margins and lateral, truncate stigma. **Pod** compressed, somewhat falcate. **Seeds** reniform, shiny, reddish brown, slightly mottled with black.

Species 2, S tropical Africa, Madagascar; in sthn Afr.: *Alistilus bechuanicus* N.E.Br., from Botswana into the North-West and the Northern Province.

Alysicarpus Desv. 3810000

(Papilionoideae—Desmodieae—Desmodiinae)

Desvaux: 120 (1813) name conserved; Harvey: 230 (1862); Schrire: 17 (1988).

Perennial or annual herbs, or undershrubs. **Leaves** 1(3)-foliolate; stipules conspicuous, persistent, glumaceous or scarious, free or connate, erect, acuminate and striate.

Flowers small, pink to purple or orange-apricot, pedicellate, in pairs, arranged in slender, elongate, spike-like pseudoracemes, terminal and leaf-opposed, rarely paniculately branched. **Calyx** rigidly glumaceous, with short, campanulate tube; lobes longer than tube, often ciliate, 2 upper often largely connate. **Petals**: vexillum sessile or somewhat clawed; wings adnate to keel; keel slightly incurved, obtuse, with membranous appendage on one or both sides. **Stamens** diadelphous. **Ovary** sessile or shortly stalked, few- to many-ovuled, sometimes glandular-pubescent; style filiform, incurved at apex, with small, capitate stigma. **Pod** linear-oblong, subterete or slightly compressed, constricted between seeds; segments often equal-sided; convex or turgid, sometimes hairy. **Seeds** suborbicular or globose. $x = 8$ (aneuploids).

Species 25–30, Africa to Asia; 4 in sthn Afr.: Namibia, Botswana, the four northern provinces to KwaZulu-Natal and Eastern Cape.

Amblygonocarpus Harms 3458000

(Mimosoideae—Mimoseae)

Harms: 191 (1897); Brenan: 32 (1959); Brenan & Brummitt: 35 (1970); Ross: 132 (1975).

Unarmed trees, glabrous. **Leaves** bipinnate, eglandular; with 2–6 pairs of pinnae, each with several pairs of alternate or sometimes subopposite leaflets. **Inflorescences** of solitary or paired axillary racemes. **Flowers** bisexual, yellowish white, pedicellate. **Calyx** gamosepalous, very small, with 5 (rarely 6) teeth. **Petals** 5 (rarely 6), free. **Stamens** 10 (rarely 12), free, fertile; anthers eglandular apically even in bud. **Ovary** very shortly stipitate. **Pod** straight or nearly so, oblong, woody, indehiscent, bluntly tetragonal or subterete in section, internally septate between seeds. **Seeds** brown, smooth, hard, unwinged.

Species 1, sthn Afr. and tropical Africa: *Amblygonocarpus andongensis* (Welw. ex Oliv.) Exell & Torre, Namibia in the Caprivi Strip and Botswana.

Amphithalea Eckl. & Zeyh. 3644000

(Papilionoideae—Liparieae)

Ecklon & Zeyher: 167 (1836); Harvey: 21 (1862); Granby: 13 (1985).

Lathriogyna Eckl. & Zeyh.: 170 (1836).

Shrubs or shrublets, sometimes ericoid, usually villous. **Leaves** simple, alternate or rarely opposite, sessile or rarely short petiolate, linear, lanceolate or ovate, flat, slightly concave or often with margins ± recurved; stipules 0. **Flowers** small, white, yellow, pink or violet, axillary and sessile or subsessile, often 2-nate, sometimes crowded into a leafy spike, sometimes in bracteate heads; bracts setaceous, linear, lanceolate or triangular; bracteoles 0. **Calyx** usually hairy, with campanulate tube; lobes unequal, the 2 upper broadest or extensively connate. **Petals**: vexillum suborbicular, oblong or obovate and often bilobed, shortly or long-clawed; wings oblong, clawed; keel straight, usually shorter than wings, obtuse, gibbous or saccate at base, clawed. **Stamens** diadelphous; vexillary stamen free, remainder connate high up, alternate anthers longer, basifixed, others versatile. **Ovary** sessile or shortly stalked, usually 1–4-ovuled, sericeous; style slightly curved upwards, glabrous or sericeous below, with minute, terminal, sometimes slightly capitate stigma. **Pod** ovate, oblong falcate or obliquely oblong, often acute, compressed, 2-valved, densely sericeous or more sparsely pubescent. **Seeds** 1–4, appendaged, green or dark.

Species ± 21, Cape, mainly southwestern districts (Western Cape), extending eastwards to near Cathcart (Eastern Cape).

***Arachis** L. 3803000

(Papilionoideae—Aeschynomeneae—Stylosanthinae)

Linnaeus:741 (1753); Hutchinson: 486 (1964); Verdcourt: 440 (1971a).

Annual or perennial herbs, erect or often prostrate. **Leaves** paripinnately 4-foliolate, rarely 3-foliolate; exstipellate; stipules partly adnate to petiole, membranous, apiculate, persistent and veined. **Flowers** yellow, sometimes striped with red, in axillary, short, dense, sessile, 2–7-flowered spikes; bracts membranous; bracteoles 0. **Calyx** membranous, filiform, 5-lobed, the upper 4 lobes joined, the lower ± free. **Petals**: vexillum suborbicular, shortly narrowed at base; wings oblong, free; keel beaked, incurved. **Stamens** all connate into a closed tube; 4 or 5 anthers elongate and subbasifixed, alternating with 4 or 5 short and versatile ones. **Ovary** subsessile, 2–4-ovuled; style filiform, very long, soon deciduous; stigma minute, terminal. **Pod** maturing below soil, oblong or sausage-shaped, 1–6-seeded, constricted between seeds but not articulated, continuous inside, functionally indehiscent, walls thick and reticulate. **Seeds** ovoid or oblong. $x = 10$ (5) (aneuploids, polyploidy).

Species ± 22 in South America, introduced elsewhere in tropics and warm temperate areas; 1 in sthn Afr.: **Arachis hypogaea* L., the Groundnut, has become naturalised as an escape from cultivation.

Argyrolobium Eckl. & Zeyh. 3673000

(Papilionoideae—Genisteae—Genistinae)

Ecklon & Zeyher: 184 (1836) name conserved; Harvey: 67 (1862); Polhill: 1000 (1971a).

Herbs or undershrubs, sometimes dwarf, sometimes with tuberous or strong rootstock, often silky or villous. **Leaves** digitately 3-foliolate; stipules free or united along leaf-opposed margin; stipels 0. **Flowers** yellow, becoming russet later, often with darker veining, sometimes 1- or 2-nate, usually in many-flowered racemes or subumbels, terminal or opposite leaves; bracts usually small. **Calyx** with shortly campanulate tube, 2-lipped; 2 upper lobes free or connate, 3 lower mainly connate. **Petals**: vexillum subsessile or shortly clawed, sometimes with 2 callosities at apex of claw, often hairy; wings oblong or obovate, with short or long claw, often transversely ridged; keel slightly incurved, usually planoconvex, sometimes oblong, clawed. **Stamens** monadelphous; tube closed or split towards base; anthers unequal, alternately long and short. **Ovary** usually shortly stalked, many-ovuled, villous; style incurved, with terminal, sometimes capitate stigma. **Pod** linear-oblong, compressed, 2-valved, with valves continuous or transversely constricted between seeds. **Seeds** mostly oblong-ovate, with a small hilum. $x = (12, 13, 14, 15, 16)$.

Species ± 70, Africa, S Europe to India; ± 50 in sthn Afr.: widespread, mainly in eastern area.

Aspalathus L. 3662000

(Papilionoideae—Crotalarieae)

Linnaeus: 711 (1753); Harvey: 94 (1862); Dahlgren: 7 (1960); Dahlgren: 9 (1961); Dahlgren: 7 (1963a); Dahlgren: 185 (1963b); Dahlgren: 10 (1963c); Dahlgren: 7 (1965a); Dahlgren: 7 (1966); Dahlgren: 512 (1969); Dahlgren: 1 (1988).

Borbonia L.: 494 (1738).

Shrublets or shrubs up to ± 2 m tall, prostrate, ascending or erect, sometimes spiny. **Leaves** usually fascicled, (1)3-foliolate, variable; leaflets varying from flat to canaliculate or terete, obtuse to mucronate or spine-tipped, with entire margin, glabrous or variously pubescent; stipules 0. **Flowers** mostly yellow, often with purplish shades, rarely white, or purple, usually in heads, or ra-

cemes, less often (1)2 or 3, axillary or terminal; bracts and bracteoles often foliaceous. **Calyx** with campanulate tube; lobes usually subequal, sometimes lowest the longest. **Petals**: vexillum usually ovate or rounded, shortly clawed, often pubescent on back; wings oblong, often with transverse ridges, clawed; keel usually planoconvex, gibbous or sometimes saccate, clawed. **Stamens** monadelphous; staminal tube split to base; anthers unequal, 5 short and dorsifixed, 4 long and basifixed and one intermediate. **Ovary** usually shortly stalked, obliquely ovate or lanceolate, glabrous or pubescent, 2–several-ovuled; style incurved, with minute, terminal, capitate stigma. **Pod** usually dehiscent, broadly ovate to lanceolate or rarely linear, turgid or compressed, 1–several-seeded. **Seeds** reniform to obliquely ovate, on filiform funicles. $x = 9$ (7, 8, 10) (high polyploidy).

Species ± 278, the largest genus of flowering plants endemic to sthn Afr.; concentrated in the Western Cape but extending into KwaZulu-Natal.

Astragalus L. 3766000

(Papilionoideae—Galegeae—Astragalinae)
Linnaeus: 755 (1753); Harvey: 224 (1862); Gillett: 413 (1964); Gillett: 1054 (1971a).

Herbs, shrublets, or shrubs, unarmed or petioles spinescent. **Leaves** imparipinnate, rarely digitately (1)3-foliolate; stipulate. **Flowers** in lax axillary racemes, bracteate or rarely ebracteate. **Calyx** with tube; lobes subequal, shorter than tube. **Petals**: vexillum sessile; wings gibbous, with linear claw; keel clawed, sometimes with 2 segments connate. **Stamens** diadelphous; anthers uniform. **Ovary** sessile or stalked, many-ovuled; style straight or incurved, with small, terminal stigma. **Pod** 2-valved, completely or incompletely divided longitudinally into 2 locules by introflexion of carinal suture. **Seeds** often reniform, on filiform funicle. $x = 8$ (10, 11, 13) (B-chromosomes, high polyploidy).

Species 2 000, mainly northern hemisphere, abundant in temperate Asia; 1 in sthn Afr.: *Astragalus atropilosulus* (Hochst.) Burge subsp. *burkeanus* (Harv.) Gillett var. *burkeanus*, the four northern provinces into KwaZulu-Natal.

Baikiaea Benth. 3507000

(Caesalpinioideae—Deterieae)
Bentham: 581 (1865); Hutchinson: 248 (1964); Brenan: 108 (1967); Ross: 35 (1977).

Unarmed evergreen or, in *B. plurijuga*, deciduous trees. **Leaves** paripinnate or imparipinnate; leaflets alternate, sometimes opposite, 1–5 jugate, large and coriaceous; stipules short. **Inflorescences** of terminal or axillary racemes. **Flowers** bisexual, irregular, large, pedicellate; bracts and bracteoles present, caducous. **Sepals** 4, the posticous one larger than the rest, very narrowly imbricate, densely fuscous- or paler brown-tomentellous outside. **Petals** 5, free, subequal, obovate, imbricate, clawed; claw winged or crisped, sometimes with longitudinal rib. **Stamens** 10, diadelphous; upper one free; remainder connate below, with alternate filaments silky-pilose below; anthers versatile, dehiscing longitudinally. **Ovary** stalked or subsessile, with several ovules, densely villous; style stout, arising obliquely from ovary; stigma small, capitate. **Pod** woody, widening from base upwards, obliquely pointed, densely brown-velvety, dehiscing longitudinally into 2 valves. **Seeds** broadly elliptic, compressed, with apex of funicle forming small, white aril. $x = 11$ (aneuploids, polyploidy).

Species 5, Africa; 1 in sthn Afr.: *Baikiaea plurijuga* Harms, Namibia and Botswana.

Baphia Afzel. ex Lodd. 3612000

(Papilionoideae—Sophoreae)
Loddiges: t. 367 (1825); Lester-Garland: 221 (1921); Brummitt: 157 (1965a); Brummitt: 49 (1971); Soladoye: 302 (1985).

Erect or scrambling shrubs, lianes or small to large trees. **Leaves** alternate, unifoliolate, pulvinate, usually large; stipules caducous. **Flowers** in lax, axillary and terminal racemes or pseudoracemes, sometimes panicled or fascicled in leaf axils; bracts smaller below, upper larger, deciduous, sometimes shorter than calyx. **Calyx** splitting into 2 reflexed lobes or down one line, retuse at base; lobes entire or 2-toothed. **Petals** subsessile or clawed; vexillum orbicular; wings oblong or obovate, white with yellow or orange blotch at base, sometimes cream-coloured, purplish pink or pinkish red; keel slightly incurved, obtuse. **Stamens** 10, free; filaments linear; anthers uniform, basifixed. **Ovary** sessile or subsessile, 2–8-ovuled; style incurved with small terminal stigma. **Pod** linear-oblong to oblanceolate, sometimes falcate, usually acuminate, flattened, 2-valved, woody, brown or purplish black. **Seeds** 1–5, lenticular. $x = 11$ (polyploidy).

Species ± 80, Africa and Madagascar; 2 in sthn Afr.: Namibia, Botswana, the four northern provinces and KwaZulu-Natal.

Bauhinia L. 3528000

(Caesalpinioideae—Cercideae)
Linnaeus: 374 (1753); Harvey: 275 (1862); Brenan: 207 (1967); Coetzer & Ross: 47 (1977).

Trees or shrubs, seldom scandent or climbing. **Tendrils** 0 but branches sometimes curling apically and tendril-like. **Leaves** alternate, sometimes simple, entire or conspicuously 2-lobed or sometimes divided to base; stipules caducous. **Inflorescence** a short, usually few-flowered raceme or flowers solitary. **Flowers** bisexual, irregular, often large and showy. **Calyx** spathaceous, with limb split down one side, 5-toothed or -lobed; lobes imbricate in bud. **Petals** 5 (rarely 6), subequal, sometimes, long-clawed. **Stamens** 10, free or connate, sometimes some reduced to staminodes; filaments variable. **Ovary** stalked, with stalk free or adnate to calyx tube, 2–many-ovuled; stigma terminal, small or variously dilated. **Pod** sometimes stalked, woody to membranous, oblong, linear, or ovate, straight to falcate, dehiscent. **Seeds** compressed. $x = 7$ (9, 11, 12, 13) (aneuploids, polyploidy).

Species numbers uncertain, cosmopolitan; 6 in sthn Afr., Namibia, the four northern provinces, Swaziland, KwaZulu-Natal and Eastern Cape; several more cultivated.

Bolusafra Kuntze 3893010

(Papilionoideae—Phaseoleae—Cajaninae)
Kuntze: 162 (1891a); Harvey: 247 (1862); Hutchinson: 422 (1964); Bullock: 200 (1965).

Perennial, twining herbs, or sprawling shrublets, sticky, scented. **Leaves** pinnately 3-foliolate, ± ovate; stipulate. **Flowers** large, bright yellow, in axillary racemes, bracteate. **Calyx** hairy, with bulbous-based hairs, with campanulate tube; lobes much longer than tube, with 2 upper slightly connate. **Petals**: vexillum eared at base, with broad, wedge-shaped claw; wings shorter than keel, eared, clawed; keel obliquely obovate, incurved, gibbous, clawed. **Stamens** diadelphous; anthers uniform. **Ovary** sessile, several-ovuled, villous; style filform, hairy in lower portion, somewhat thickened and glabrous in upper portion, with terminal, capitate stigma. **Pod** obliquely oblong, turgid, 2-valved, hairy. **Seeds** globose, black.

Species 1, sthn Afr.: *Bolusafra bituminosa* (L.) Kuntze, the Western Cape.

Bolusanthus Harms 3607010

(Papilionoideae—Sophoreae)
Harms: 14 (1906); Phillips: t. 23 (1921).

Small trees or shrubs. **Leaves** imparipinnate, 3–6-jugate, pulvinate; leaflets opposite or alternate; usually lanceolate, acuminate. **Flowers** blue or purple, in lax, terminal, pendulous racemes; bracts subulate, caducous. **Calyx** with campanulate tube and 5 lobes; lobes ovate-lanceolate, with 2 upper lobes connate high up. **Petals**: vexillum semiorbicular, slightly lobed at apex, clawed at base; wings oblong, obtuse, clawed, eared at base of limb; keel as long as wings, eared at base of limb. **Stamens** free, subequal; filaments with elliptic, versatile anthers. **Ovary** subsessile, linear-oblong, 4- or 5-ovuled, silky. **Style** terete, curved; stigma small and capitate. **Pod** usually linear, rarely oblong-linear, compressed. **Seeds** 1–4. $x = 8$.

Species 1, sthn Afr.:, *Bolusanthus speciosus* (Bolus) Harms, Northern Province, northern Mpumalanga and Swaziland.

Bolusia Benth. 3732000

(Papilionoideae—Crotalarieae)
Bentham: t. 1163 (1873); Hutchinson: 360 (1964); Polhill: 995 (1971a).

Perennial herbs or undershrubs up to 0.50 m tall. **Leaves** unifoliolate or digitately trifoliolate, glabrous or densely pubescent; stipules various. **Flowers** greenish yellow to pale pink, sometimes with purplish marks, solitary or 2-nate, opposite leaves, bracteate. **Calyx** with shortly campanulate tube; lobes subequal, sometimes with 2 upper and laterals approximate. **Petals**: vexillum sometimes hooded and keeled; with short, sharply reflexed, channelled claw; wings clawed; keel linear, spirally contorted, spurred at base. **Stamens** diadelphous, enclosed and coiled with keel; anthers unequal. **Ovary** sessile, many-ovuled; style enclosed in spiral keel, with terminal stigma. **Pod** oblong, turgid, many-seeded, dehiscent. **Seeds** oblique-cordiform, with a deep hilar sinus.

Species 5 or 6, drier parts of Africa south of the equator; 2 in sthn Afr., Namibia and Northern Cape.

Brachystegia Benth. 3504000

(Caesalpinioideae—Amherstieae)
Bentham: 582 (1865); Brenan: 157 (1967).

Mostly trees, rarely suffrutices. **Leaves** paripinnate, stipulate; leaflets sessile, diverse in number, size and shape, normally opposite, in 2–72 pairs, usually covered with obscure translucent dots. **Inflorescence** a simple or paniculate raceme, usually terminal, rarely lateral on older branchlets. **Flowers** bisexual, ± irregular, completely enclosed in bud by 2 opposite valvate bracteoles, persisting in flower. **Tepals** 0 or 1–10, much shorter than bracteoles, free or with 2 or 3 partly united, imbricate, valvate or open in aestivation. **Stamens** usually 10, all fertile, alternately long and short, free or shortly united; filaments or tube continuous externally with margin of very short cupular or turbinate calyx tube; mouth of calyx tube with or without a disc formed of obvious or obscure internal glandular swellings. **Ovary** oblong or naviculiform, stipitate; style long; stigma small, subcapitate; ovules 5–10. **Pod** flat, woody, soon glabrous, oblong or naviculiform, beaked at apex, dehiscing elastically, valves becoming spirally twisted; adaxial suture with a flange-like wing on each side. **Seeds** compressed, subsessile. $x = 12$ (1 report).

Species ± 30, confined to tropical Africa; 1 in sthn Afr.: *Brachystegia boehmii* Taub., in Botswana.

Burkea Benth. 3474000

(Caesalpinioideae—Caesalpinieae)
Bentham: 593 (1843); Harvey: 271 (1862); Brenan: 221 (1967); Ross: 15 (1977).

Unarmed, trees, rusty-tomentose on young branchlets. **Leaves** petiolate, bipinnate, with (1)2–5(7) pairs of pinnae; leaflets usually somewhat elliptic, leathery, eglandular. **Inflorescences** of elongated spikes, simple or often paniculately aggregated; bracts small, persistent until flowers open. **Flowers** bisexual, irregular, 5-merous, small. **Calyx** shortly campanulate, with oblong lobes longer than tube, valvate. **Petals** subequal, obovate-oblong, imbricate, **Stamens** 10, subequal; anthers with sessile apical gland. **Ovary** subsessile, 1(2)-ovulate, densely rusty-tomentose; style thick; stigma terminal, funnel-shaped, slit down one side. **Pod** stipitate, coriaceous, elliptic, oblong or lanceolate, flattened, indehiscent. **Seeds** compressed with an areole on each face, sometimes aborted.

Species 1: *Burkea africana* Hook., tropical and subtropical Africa; N Namibia, and the four northern provinces.

Caesalpinia L. 3559000

(Caesalpinioideae—Caesalpinieae)
Linnaeus: 380 (1753); Harvey: 269 (1862); Hutchinson: 260 (1964); Brenan: 28 (1967); Schreiber: 7 (1967b); Ross: 122 (1977).

Trees or shrubs, sometimes scandent, usually armed with spines or prickles but sometimes unarmed. **Leaves** bipinnate or rarely with pinnae digitately arranged; leaflets opposite, rarely alternate, few to many, glandular or sometimes eglandular; stipules various. **Inflorescence** of terminal, sometimes falsely lateral, or terminal and axillary racemes or panicles; bracts various, sometimes caducous. **Flowers** bisexual, irregular, often large. **Calyx** with short, campanulate tube, 5 lobes longer than tube, imbricate. **Petals** 5, not all equal, upper one usually somewhat modified and usually with a small lamina and a more pronounced claw. **Stamens** 10, free, declinate; filaments often glandular or villous at base; anthers dorsifixed. **Ovary** subsessile or shortly stipitate, 2–10-ovuled; style with terminal, truncate, concave or hollow stigma. **Pods** very variable, compressed, ovate, oblong, lanceolate, or sometimes falcate, indehiscent or dehiscent and 2-valved, hard and woody or thick and pulpy, sometimes spiny. **Seeds** transverse or nearly so, hard. $x = 12$ (aneuploids, polyploidy).

Species ± 200, cosmopolitan in warm regions; 6 indigenous in sthn Afr., Namibia, Botswana, Mpumalanga, KwaZulu-Natal and Northern Cape; others introduced; **Caesalpinia decapetala* (Roth) Alston, has run wild, especially in eastern areas; see Henderson & Anderson: 176 (1966).

***Cajanus** DC. 3892000

(Papilionoideae—Phaseoleae—Cajaninae)
Candolle: 85 (1813) name conserved; Hutchinson: 421 (1964); Verdcourt: 709 (1971b).

Erect shrubs or shrublets with adpressed or slightly spreading silky pubescence. **Leaves** pinnately 3-foliolate; leaflets elliptic to lanceolate, resinous-glandular on lower surface; stipules small. **Flowers** yellow or lined with purple, in terminal panicles together with several subcapitate axillary racemes; bracts ovate, caducous. **Calyx** 5-lobed; lobes subequal, upper pair joined. **Petals**: vexillum orbicular, reflexed, eared; keel incurved at apex. **Stamens** with uniform anthers. **Ovary** subsessile, elongate, 4–6-ovuled, velvety hairy; style

thickened above, flattened below the small, capitate stigma. **Pod** linear-oblong, inflated, obliquely acute, compressed, 2-valved, obliquely depressed between seeds with transverse grooves. **Seeds** rounded, compressed. $x = 11$ (8) (polyploidy).

Species 2, one native to West Africa. **Cajanus cajan* (L.) Millsp., Dhal or Pigeon-pea, widely cultivated throughout the tropics and partially naturalised in Namibia, the four northern provinces, Swaziland and KwaZulu-Natal.

Calliandra Benth. 3444000

(Mimosoideae—Ingeae)
Bentham: 138 (1840); Thulin *et al.*: 29 (1981).

Much-branched spreading shrubs with spinescent stipules, in pairs, straight or often deflexed. **Leaves** small; petiole short, pubescent, adaxial gland 0; pinnae in 1 pair; leaflets in 2–9 pairs, oblong or elliptic, pubescent or subglabrous and usually with minute, reddish, purplish or whitish glands at point of attachment of leaflets. **Inflorescence** apparently capitate, reduced on axillary peduncles. **Flowers** bisexual, 2–4 per inflorescence, rarely solitary; peduncles conspicuously glandular, pubescent. **Calyx** cupular, with 5 obtuse lobes, pubescent. **Corolla** 5-lobed, pubescent. **Stamens** many, long-exserted; filaments united into a tube basally; anthers dorsifixed, glabrous and eglandular. **Ovary** glabrous or shortly stipitate; style filiform; stigma capitate. **Pod** linear-oblong to oblanceolate, straight, 1–4-seeded, dehiscent acute or acuminate apically. **Seeds** rounded or compressed. $x = 8$ (11) (polyploidy).

Species 2, in tropical Africa; 1 in sthn Afr.: *Calliandra redacta* (J.H.Ross) Thulin & Hunde, restricted to the Northern Cape on granite ridges.

Calpurnia E.Mey. 3607000

(Papilionoideae—Sophoreae)
Meyer: 2 (1836); Harvey: 266 (1862); Phillips: 475 (1917); Brummitt: 12 (1967); Polhill: 46 (1971b).

Shrubs or small trees. **Leaves** imparipinnate with 3–many pairs of leaflets, pulvinate; stipules small; leaflets frequently mucronate, exstipellate. **Flowers** yellow in few- to many-flowered, axillary or terminal racemes, frequently in panicles. **Calyx** with campanulate tube, 5-lobed, with 2 upper lobes smallest and partly connate. **Petals**: vexillum clawed, with claw deeply channelled and limb reflexed and bilobed; wings clawed, oblong, obtuse; keel clawed, obtuse. **Stamens** free or connate at base; anthers small, oblong. **Ovary** stalked, several-ovuled; style arcuate, with small, capitate stigma. **Pod** usually broadly linear, sometimes with a narrow wing on ventral suture, tipped with the remains of style. **Seeds** compressed, ovate-oblong, with small hilum near the narrow end; radicle incurved. $x = 9$.

Species ± 16, Africa; ± 7 in sthn Afr.: the four northern provinces, Swaziland, KwaZulu-Natal and Eastern Cape.

Canavalia DC. 3891000

(Papilionoideae—Phaseoleae—Diocleinae)
Candolle: 325 (1825a) name conserved; Harvey: 238 (1862); Sauer: 106 (1964); Verdcourt: 571 (1971b).

Woody lianes or perennial herbs, prostrate or twining. **Leaves** pinnately 3-foliolate; stipules small, caducous. **Flowers** showy, white to purple, usually clustered along a peduncle in axillary racemes. **Calyx** with campanulate tube, 5-lobed; lobes 2-lipped; upper lip large, truncate or 2-fid; lower smaller, subentire or 3-fid. **Petals**: vexillum large, obovate, reflexed, eared at base, clawed, with 2 callosities or ridges above claw; wings falcate or subtwisted, eared, with callosity on ear, clawed; keel broader than wings, incurved, obtuse or obtusely beaked, with beak usually inflexed or spiral, sometimes eared, gibbous, clawed. **Stamens** monadelphous or imperfectly diadelphous; anthers uniform. **Ovary** subsessile, many-ovuled, often surrounded at base by cupular disc, sometimes hairy, style incurved or folded with keel; stigma terminal, sometimes subcapitate. **Pod** large, oblong, compressed or turgid, dehiscent, 2-valved, often with 2 ridges on sutures, sometimes velvety. **Seeds** black, white or reddish, often elliptic. $x = 11$ (aneuploids, polyploidy).

Species ± 50, cosmopolitan in warm regions; 6 in sthn Afr.: Namibia, North-West, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape near East London.

Cassia L. emend. Gaertn. 3536000

(Caesalpinioideae—Cassieae)
Linnaeus: 376 (1753); Harvey: 271 (1862); Hutchinson: 246 (1964); Brenan: 47 (1967); Gordon-Gray: 69 (1977).

Unarmed trees. **Leaves** simply paripinnate; leaflets frequently 5–12-jugate; stipules various, conspicuous. **Inflorescence** an axillary, many-flowered raceme, sometimes cauliflorous; bracteoles 2, at base of pedicels. **Sepals** obtuse, pubescent to glabrescent. **Petals** 5, imbricate, subisomorphic, vexillar one interior in bud, usually much larger than calyx, sometimes clawed. **Stamens** 10, sometimes unequal, its members strongly accrescent towards abaxial side of flower; filaments twice to many times as long as the dorsifixed anthers, those of 3 long abaxial stamens sigmoidally arcuate, those of the rest straight; anthers dehiscing by terminal or basal pores, or at both ends. **Ovary** sessile or stalked, frequently curved, with several to many ovules; style with terminal, truncate stigma. **Pod** terete, bluntly tetragonal or compressed-tetragonal, sometimes sulcate along sutures, or compressed but turgid, usually much elongate, indehiscent, valves firmly papery, leathery or ligneous, cavity divided by transverse septa into 1 rank or in addition by a longitudinal septum into 2 ranks of 1-seeded locules. **Seeds** transverse, occasionally oblique or longitudinal, ± compressed parallel to septa. $x = 6, 7, 8, 9, 13$ (B-chromosomes, high polyploidy).

Species ± 30, circumtropical (America, Africa, Madagascar, Asia, Malaysia, Australia); 1 in sthn Afr.: *Cassia abbreviata* Oliv. subsp. *beareana* (Holmes) Brenan, N Namibia, Botswana, Northern Province and Mpumalanga; some other species introduced as ornamentals.

***Ceratonia** L. 3529000

(Caesalpinioideae—Cassieae)
Linnaeus: 1020 (1753); Hutchinson: 255 (1964); Brenan: 16 (1967).

Evergreen, unarmed shrubs or trees, often monoecious. **Leaves** simply pinnate; leaflets 2–8, coriaceous; stipules minute, caducous. **Inflorescence** a dense, many-flowered raceme, axillary or often arising from old wood. **Flowers** unisexual or bisexual, irregular, small. **Calyx** caducous. **Petals** 0. **Stamens** 5, free. **Pod** laterally compressed, coriaceous, many-seeded, indehiscent. $x = 12$.

Species 2, Arabian Peninsula and Somalia. **Ceratonia siliqua* L., Carob tree, Mediterranean region, dense ornamental, with nutritious pods, may be found as an escape.

Chamaecrista Moench 3536010

(Caesalpinioideae—Cassieae)
Moench: 272 (1794); Irwin & Barneby: 28 (1976); Irwin & Barneby: 106 (1981).

Trees, shrubs, perennial or annual herbs. **Leaves** paripinnate; extrafloral nectaries often present on peti-

oles and sometimes on axis of racemes, when present patelliform, scutiform or cupular, secretory surface plane or concave. **Inflorescence** a 1–many-flowered raceme, usually axillary; pedicels 2-bracteolate near or above middle. **Flowers** bisexual, irregular. **Petals** yellow, sometimes red-marked near claw, often highly heteromorphic, 2 abaxial ones variously oblique, vexillar one usually interior in bud, sometimes exterior on one or both sides. **Stamens** (2–)5–10, the basifixed anthers longer than their short filament, equal or unequal, but if unequal not accrescent towards abaxial side of flower, lateral sutures incurved puberulent or pilosulous, dehiscence apical by pore or short slit. **Pod** planocompressed, very rarely winged along sutures, elastically dehiscent, valves papery, leathery or subligneous, coiling. **Seeds** either smooth or pitted. $x = 8$.

Species ± 250, primarily neotropical; 9 in sthn Afr., widespread.

*Clitoria L. 3857000

(Papilionoideae—Phaseoleae—Clitoriinae)
Linnaeus: 753 (1753); Hutchinson: 446 (1964); Verdcourt: 515 (1971b).

Climbing or erect herbs or shrubs, rarely trees. **Leaves** pinnately 3–9-foliolate, more rarely 1-foliolate; stipules and stipels present. **Flowers** mostly blue, red or white, in racemes, or solitary or paired, axillary, bracteate; upper pairs of bracts connate. **Calyx** 5-lobed; upper 2 lobes joined at base. **Petals**: vexillum large, rounded, erect, emarginate, without appendages. **Stamens** with vexillary one free or ± joined to the bundle; anthers almost uniform or 5 dorsifixed alternating with 5 subbasifixed. **Ovary** stalked, 2–many-ovuled; style elongated, incurved, bearded inside at slightly dilated apex with small terminal stigma. **Pod** linear-oblong, compressed, sometimes longitudinally ribbed, filled with soft tissue but not septate. **Seeds** subglobose or ellipsoid, compressed. $x = 8$ (6, 7) (aneuploids, polyploidy).

Species ± 70, pantropical, mostly neotropical; 1 in sthn Afr.: **Clitoria ternatea* L., becoming naturalised in parts of N Namibia and Mpumalanga, including the Kruger National Park.

Coelidium Vogel ex Walp. 3646000

(Papilionoideae—Liparieae)
Walpers: 472 (1839); Harvey: 24 (1862); Granby: 12 (1980).

Shrublets ± woody from a woody rootstock, ericoid, usually villous, rarely branchlets ending in spines. **Leaves** simple, sessile, sometimes remote, ovate-lanceolate, concave or flattish, sometimes pungent; stipules 0. **Flowers** white to pinkish purple, seldom bright yellow, frequently with darker keel, usually subsessile and clustered in axils of upper leaves, or in small heads, often paired, pedicels 1-bracteolate. **Calyx** pubescent or villous, with campanulate tube; lobes subequal or with upper 2 extensively connate. **Petals**: vexillum ovate-elliptic or shortly suborbicular, emarginate, shortly and broadly clawed; wings with long claw, sometimes eared at base; keel with pocket on either side, long-clawed. **Stamens** monadelphous; staminal tube sometimes split and short or adnate to lower portion of calyx tube; anthers alternately longer and basifixed, and shorter and versatile. **Ovary** sessile or shortly stalked, narrowly ovate, often slightly compressed, 1-ovuled, villous; style incurved with terminal stigma. **Pod** compressed, obliquely ovate, often beaked, 2-valved, pubescent. **Seeds** ± oblong. $x = 9$ (1 report).

Species ± 20, SW Western Cape as far north as Nieuwoudtville (Northern Cape, Calvinia District) and as far east as the Outeniqua and Kouga Mountains (Eastern Cape).

Colophospermum J.Kirk ex J.Léonard 3490010

(Caesalpinioideae—Detarieae)
Léonard: 390 (1949); Hutchinson: 255 (1964); Ross: 16 (1977).

Unarmed trees, small to medium-sized or shrubs. **Leaves** 2-foliolate; leaflets opposite, obliquely ovate, with 7–12 prominent nerves arising from point of attachment, without midrib, coriaceous, with many pellucid gland-dots; stipules small, caducous. **Flowers** bisexual, irregular, small, in racemes or panicles; bracts minute; bracteoles 0. **Calyx** with 4 sepals. **Corolla** 0. **Stamens** 20–25, free; anthers dorsifixed, dehiscing by longitudinal slits. **Ovary** stalked, compressed, glabrous, with 1 lateral ovule; style lateral. **Pod** compressed, usually reniform, 1-seeded, indehiscent, with many scattered glands. **Seed** large, compressed, reniform, corrugated, with many small reddish resin glands. $x = 9$ (polyploidy).

Species 1: *Colophospermum mopane* (Kirk ex Benth.) Kirk ex J.Léonard (= *Copaifera mopane* Kirk ex Benth.), south-tropical Africa: Namibia to Mpumalanga lowveld.

Cordyla Lour. 3573000

(Papilionoideae—Swartzieae)
Loureiro: 411 (1790); Brenan: 221 (1967); Ross: 133 (1977).

Unarmed deciduous trees, rarely shrubby. **Leaves** imparipinnate; leaflets alternate or rarely subopposite, oblong, shortly stalked, many-jugate, with many pellucid dots or streaks; stipules caducous. **Flowers** bisexual, sometimes male, in short, axillary racemes; bracts persistent. **Calyx** with campanulate tube, 3-lobed. **Petals** 0. **Stamens** many (± 23–126), arising in throat of calyx tube; filaments connate towards base; anthers small, dorsifixed, dehiscing by longitudinal slits; connective glandular apically. **Ovary** on long stalk, ellipsoid, with 2–few ovules; style with terminal, simple stigma. **Fruit** stalked, drupaceous, ellipsoid to subglobose, sometimes as large as a tennis ball, yellow when ripe, 1- or 2-seeded. **Seeds** large, thin-walled, not arillate. $x = 10$ (1 report).

Species 5, Africa and Madagascar; 1 in sthn Afr., *Cordyla africana* Lour.; warm valleys in Mpumalanga, Swaziland and N KwaZulu-Natal.

Craibia Harms & Dunn 3720010

(Papilionoideae—Tephrosieae)
Harms & Dunn: 106 (1911); Gillett: 189 (1960); Hutchinson: 378 (1964); Gillett: 146 (1971b).

Trees or shrubs, usually with golden brown or black indumentum. **Leaves** pulvinate, usually imparipinnate, rarely 1-foliolate; leaflets usually up to 11, alternate or rarely subopposite, acuminate; stipels present or 0. **Flowers** white, usually speckled or streaked with pink or purple, usually fragrant, in terminal, rarely axillary, racemes or panicles; bracts and bracteoles caducous. **Calyx** tubular, with short lobes, upper pairs united for half their length. **Petals**: vexillum shortly clawed, with lamina oblong, not appendaged; wings and keel auriculate. **Stamens** monadelphous or diadelphous; adaxial stamen free, but sometimes adhering in middle; anthers uniform, without appendages. **Ovary** shortly stalked; style with a small, terminal punctate or capitate stigma; ovules 2–6. **Pod** flat, asymmetric, shortly beaked, dehiscing into thin, woody, twisted valves. **Seeds** 1–3, ellipsoid, black or dark brown.

Species 10, tropical Africa; 1 in sthn Afr.: *Craibia zimmermannii* (Harms) Dunn, N KwaZulu-Natal and possibly Swaziland.

Crotalaria L. 3669000

(Papilionoideae—Crotalarieae)

Linnaeus: 714 (1753); Harvey: 39 (1862); Verdoorn: 371 (1928); Polhill: 169 (1968); Polhill: 3 (1982).

Herbs, undershrubs, or shrubs, rarely spinescent. **Leaves** simple, 1-foliolate or digitately 3(–7)-foliolate, usually petiolate; stipules various, occasionally simple, filiform to foliaceous or lacking. **Flowers** usually yellow, less often white or pink, rarely solitary, usually in heads or racemes opposite leaves or terminal; bracts small; bracteoles paired. **Calyx** often with obliquely campanulate tube, usually 2-lipped; lobes variable. **Petals**: vexillum mostly cordate and bicallosed at base within, usually clawed, glabrous or hairy outside; wings shorter than keel; keel angled or rounded near base or ± halfway, generally produced into a beak. **Stamens** monadelphous; tube split; anthers unequal, alternatively long, basifixed, and smaller, dorsifixed. **Ovary** sessile or stalked, 2–many-ovuled; style curved or geniculate, basal portion thick, often laterally pubescent; stigma usually small, rarely bilobed. **Pod** sessile to long-stipitate, globose or cylindric, turgid or inflated, 5-valved, dehiscent. **Seeds** 1–many, oblique-cordiform to oblong-reniform, on filiform funicles. $x = 7, 8$ (aneuploids, polyploidy, B-chromosomes).

Species over 600, fairly cosmopolitan in the tropics and extending into the subtropics particularly to the southern hemisphere; ± 64 in sthn Afr., widespread.

Cullen Medik. 3703010

(Papilionoideae—Psoraleeae)

Medikus: 380 (1787); Stirton: 317 (1981a); Stirton: 342 (1981b).

Shrubs, suffrutices or herbs. **Leaves** 3–1-foliolate or, if digitately 3–5-foliolate, then leaflet margins entire, otherwise either coarsely dentate and conspicuously gland-dotted to undulate and repand-denticulate and black-punctate; leaflets ovate, lanceolate, orbiculate or elliptic, glabrous to densely pubescent; stipules linear-subulate, free and adhering to base of leaf rachis, persistent. **Flowers** purple, purple-blue, rarely pale-coloured, sessile, occasionally subsessile, aggregated in 3–40 triplets into long axillary pedunculate spikes or shortly pedunculate or subsessile axillary clusters, each triplet of flowers subtended by a single ovate bract. **Calyx** either glabrous or strongly glandular-punctate, campanulate with lowest lobe longest, or densely pubescent, sparsely glandular and bilabiate with lowest lobe longest and upper lobes connate high up. **Petals**: vexillum narrowly obovate or obovate with weakly developed claw and auricles without appendages; wing petals longer than keel, oblong with prominent basal lobe; sculpturing well developed; keel broadly obliquely lunate. **Stamens** diadelphous; vexillary stamen usually free or subbasifixed, rest united into a sheath slit adaxially; anthers uniform, alternately basifixed and versatile. **Ovary** substipitate, either glabrous with club-headed glands or pubescent; style upcurved, slender, rarely swollen; stigma either minute or capitate, rarely penicillate. **Pod** erect, indehiscent, conspicuously glandular-warty, glabrous or white pubescent. **Seeds** obliquely reniform.

Species ± 40, a few in drier parts of Africa, but most extending through India and Sri Lanka to Burma, Phillipines, Papua New Guinea and Australia; 4 in sthn Afr., widespread.

Cyamopsis DC. 3700000

(Papilionoideae—Indigofereae)

Candolle: 230 (1825b); Gillett: 6 (1958a); Gillett: 328 (1971b).

Herbs, hairy with biramous hairs. **Leaves** imparipinnately 3-foliolate; leaflets often dentate; stipules small, setaceous. **Flowers** small, in axillary racemes, ebracteate. **Calyx** with obliquely campanulate tube; lower lobes longest. **Petals** similar, glabrous; vexillum sessile, somewhat pointed, markedly veined; wings sessile; keel sessile, incurved, obtuse. **Stamens** monadelphous, with closed tube; anthers uniform, with apiculate connective. **Ovary** sessile, few- to many-ovuled; style incurved at apex, with capitate stigma. **Pod** linear, somewhat 4-angled, beaked, 2-valved, septate within. **Seeds** quadrate, compressed. $x = 7$.

Species ± 4, Africa to India; 2 in sthn Afr.; Namibia, Botswana and Northern Cape, with another species introduced into KwaZulu-Natal.

Cyclopia Vent. 3620000

(Papilionoideae—Podalyrieae)

Ventenat: 8 (1808); Harvey: 6 (1862); Phillips & Hofmeyr: 105 (1922); Kies: 161 (1951).

Erect branched shrubs. **Leaves** sessile, digitately or palmately 3-foliolate; leaflets linear to lanceolate or occasionally ovate, glabrous or pubescent, frequently with revolute margins. **Flowers** yellow, solitary and axillary; bracts 2(3). **Calyx** with shallow tube, truncate and intruse at base and with usually triangular lobes slightly longer than tube. **Petals**: vexillum rounded, plaited at base, with short claw; wings oblong, with transverse fold; keel incurved, obtusely beaked, with small, triangular pocket. **Stamens** 10, free or slightly connate at base; filaments dilated. **Ovary** sessile or shortly stalked, several-ovuled, glabrous. **Pod** oblong, compressed, with coriaceous valves. **Seeds** small, with a strophiole. $x = 9$ (1 report, polyploidy).

Species ± 20, Western Cape, mainly southwestern districts, extending eastwards to near Uitenhage (Eastern Cape).

***Cytisus** Desf. 3682000

(Papilionoideae—Genisteae—Genistinae)

Desfontaines: 139 (1798); Hutchinson: 351 (1964); Frodin & Heywood: 86 (1968); Bisby: 424 (1981).

Sarothamnus Wimm.: 278 (1832).

Unarmed shrubs or small trees, of diverse habit. **Leaves** usually 3-foliolate and petiolate, sometimes 1-foliolate or simple, sometimes crowded on older branches; stipules free, adnate to leaf bases or 0. **Flowers** usually yellow to white, in terminal racemes or in axillary condensed short shoots sometimes aggregated to form pseudoracemes or terminal heads; small bract and 2 bracteoles sometimes present. **Calyx** campanulate, 2-lipped; upper lip 2-toothed, lower lip shortly 3-toothed. **Petals**: vexillum suborbicular or ovate; wing obovate or oblong; keel oblong-falcate to semicircular, always curved on lower side, often slightly beaked, usually glabrous. **Stamens** monadelphous. **Ovary** sessile or rarely shortly stipitate; style usually curved ± in middle, sometimes convolute after anthesis and expanded beneath capitate or introrse stigma. **Pod** chartaceous to slightly coriaceous, usually oblong or linear-oblong, often slightly curved, several- to many-seeded, dehiscent. **Seeds** ovate-oblong or obliquely elliptic. $x = 12, 13, 23, 24, 25$ (polyploidy, B-chromosomes).

Tree Lucerne; several species have been introduced as fodder plants, some have become partly naturalised in the winter-rainfall area of the Cape region.

Dalbergia L.f. 3821000

(Papilionoideae—Dalbergieae)

Linnaeus f.: 52 (1782; '1781') name conserved; Harvey: 264 (1862); Polhill: 95 (1971b).

Trees, sometimes strongly scandent or woody lianes, sometimes with branches modified as spines or climbing

aids. **Leaves** imparipinnate, few- to many-jugate, rarely 1-foliolate; stipules various, small and usually caducous. **Flowers** small, white to yellowish cream-coloured, sometimes fragrant, often many, in axillary or terminal, dichotomous cymes or subcorymbose panicles, bracteate. **Calyx** with campanulate tube, shortly 5-lobed; 2 upper lobes often broader and 3 lower longer and narrower than others. **Petals**: vexillum usually emarginate, clawed; wings shortly clawed; keel often eared, clawed. **Stamens** monadelphous or diadelphous or splitting into 2 bundles, sometimes vexillary stamen 0; anthers uniform, small, erect, didymous, opening at apex or rarely longitudinally. **Ovary** stalked, 1–few-ovuled, sometimes hairy; style short, incurved, with small, terminal stigma. **Pod** oblong or linear, usually compressed, sometimes thickened over seed cavity, indehiscent. **Seeds** 1–4, flattish, subreniform. $x = 10$.

Species ± 100, pantropical in warm regions; 7 in sthn Afr.: Namibia, Botswana, the four northern provinces, Swaziland, KwaZulu-Natal and Eastern Cape.

Decorsea R.Vig. 3910030

(Papilionoideae—Phaseoleae—Phaseolinae)
Viguier: 181 (1952); Verdcourt: 442 (1970b); Verdcourt: 611 (1971b).

Voluble, perennial herbs; rootstock possibly tuberous. **Leaves** pinnately 3-foliolate, bracteate; leaflets ± ovate-lanceolate. **Flowers** in axillary, shortly pedunculate clusters or fascicles, sometimes precocious. **Calyx** appearing 4-lobed, upper 2 united into a low rounded lip. **Petals**: vexillum oblate, reflexed, glabrous, only slightly auriculate; keel incurved through 180–360°. **Ovary** linear, 9–14-ovuled; style of two parts, the upper incrassate, the basal one tenuous; stigma terminal, penicillate, with simple or branched hairs. **Pod** linear, almost straight, not septate. **Seeds** oblong or narrowly oblong, compressed.

Species ± 4, Madagascar and Africa; 3 in sthn Afr.: Namibia, North-West, Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal and Eastern Cape.

Derris Lour. 3838000

(Papilionoideae—Tephrosieae)
Loureiro: 432 (1790) name conserved; Hutchinson: 384 (1964); Polhill: 73 (1971b).

Woody, climbing shrubs or rarely trees. **Leaves** imparipinnate, sometimes only pinnately 3-foliolate; leaflets opposite; stipels 0. **Flowers** in terminal and axillary racemes or panicles; bracts small, often caducous. **Calyx** often cyathiform, with short or obsolete teeth. **Petals** violet, purple or white; vexillum ovate, obovate or orbicular; wings obliquely oblong, slightly adherent to keel above claw; keel slightly incurved. **Stamens** with vexillary stamen free at base and connate with others from middle in closed tube, rarely altogether free; anthers versatile. **Ovary** sessile or shortly stalked, 2–more-ovuled; style filiform, incurved, with small, terminal stigma. **Pod** obliquely oblong or elongated, flat, indehiscent, with upper suture or both sutures margined with a narrow wing. **Seeds** flat, reniform or orbicular. $x = 11$ (aneuploids).

Species ± 50, tropical regions in the Old World; 1 in sthn Afr.: *Derris trifoliolata* Lour. (= *Derris uliginosa* Benth.), N KwaZulu-Natal.

*__Desmanthus__ Willd. 3450000

(Mimosoideae—Mimoseae)
Willdenow: 1044 (1806) name conserved; Hutchinson: 281 (1964); Ross: 120 (1975).

Trees, shrubs or perennial herbs, unarmed. **Leaves** bipinnate; a gland often present at the junction of the lowest pair of pinnae; pinnae each with several to many pairs of small leaflets; stipules setaceous, persistent. **Inflorescences** capitate, pedunculate, axillary, solitary. **Flowers** in ovate-globose heads, all bisexual or lower neuter and sometimes without petals but with short staminodes. **Calyx** campanulate, shortly 5-dentate. **Petals** 5, free or cohering slightly. **Stamens** 10 or 5, free, exserted; anthers eglandular apically. **Ovary** subsessile; style subulate or thickened above; stigma terminal. **Pods** linear, straight or ± falcate, compressed, dehiscing into 2 valves, continuous within or subseptate between seeds. **Seeds** lying lengthwise or obliquely in the pod, compressed. $x = 7, 11$ (aneuploids).

Species ± 22, mainly in the tropics and subtropics of the New World; 1 species: **Desmanthus virgatus* (L.) Willd., has become naturalised in KwaZulu-Natal near Pietermaritzburg.

Desmodium Desv. 3807000

(Papilionoideae—Desmodieae—Desmodiinae)
Desvaux: 122, t. 5 (1813) name conserved; Harvey: 227 (1862); Schrire: 12 (1988).

Herbs, mainly perennial, undershrubs, or shrubs, erect, ascending or decumbent to scrambling. **Leaves** usually pinnately 3-foliolate, occasionally digitately 3-foliolate, rarely 1- or 5-foliolate; stipules often striate. **Flowers** commonly purple, mauve or pink and hyaline, rarely red, in terminal or occasionally subaxillary racemes or panicles, rarely flowers clustered or solitary or in shortly peduncled, axillary racemes, bracteate. **Calyx** usually broadly campanulate to shortly tubular; lobes longer than tube, 2 upper lobes ± connate, 3 lower acute or subulate-acuminate. **Petals**: vexillum sometimes clawed; wings ± united with keel; keel nearly straight to incurved. **Stamens** mostly diadelphous rarely monadelphous; anthers uniform, basifixed. **Ovary** sessile or stalked, 2–many-ovuled, sometimes hairy; style inflexed or incurved, with terminal stigma. **Pod** exserted from calyx, constricted into membranous or coriaceous, flat or rarely turgid segments which separate on maturity. **Seeds** compressed, often flat, transversely broadly elliptic, ovate or reniform. $x = 11$ (aneuploids).

Species ± 300, cosmopolitan in tropical and subtropical regions, with centres of diversity in E Asia, Mexico and Brazil; 10 in sthn Afr.: Namibia, Botswana, the four northern provinces, Swaziland, KwaZulu-Natal and Eastern Cape.

Dialium L. 3530000

(Caesalpinioideae—Cassieae)
Linnaeus: 3 (1767); Hutchinson: 231 (1964); Brenan: 103 (1967); Ross: 65 (1977).

Unarmed trees or (rarely) large shrubs, not climbing. **Leaves** simply imparipinnate; leaflets 3–21, opposite to alternate; stipules small, usually caducous. **Inflorescences** of terminal and lateral many-flowered panicles; bracts and bracteoles small, soon deciduous. **Flowers** bisexual, irregular or sometimes regular, small. **Calyx** with short or obsolete tube and 5–7 imbricate lobes or segments. **Petals** (0)1–5, shorter than calyx. **Stamens** 2–3(5–10); anthers large, oblong or oblong-ovate. **Disc** sometimes present, wider than ovary. **Ovary** sessile or stalked, 2-ovuled, frequently tomentose; style with small, terminal stigma. **Pod** somewhat ovoid-orbicular, slightly compressed, indehiscent. **Seeds** 1 or 2, ± compressed. $x = 14$ (can also be 7).

Species ± 35, mainly tropical Africa, spreading to Madagascar and Malay Peninsula; 2 in sthn Afr.: Namibia, Botswana and N KwaZulu-Natal.

Dichilus DC. 3664000

(Papilionoideae—Crotalarieae)

Candolle: 136 (1825a); Candolle: 201, t. 35 (1826); Harvey: 77 (1862); Schutte & Van Wyk: 182 (1988).

Undershrubs or herbs, slender. **Leaves** petiolate, digitately 3-foliolate; stipules inconspicuous or 0. **Flowers** 1–3 at ends of branches; bracts minute. **Calyx** distinctly shorter than corolla, with campanulate tube, 2-lipped, glabrous; upper lip 2-toothed or -lobed; lower lip 3-toothed or -lobed. **Petals**: vexillum reflexed, oblong to suborbicular, with a short channelled claw; wings obliquely oblong, eared, clawed; keel slightly shorter than vexillum, much longer than wings, obovate, eared, saccate or gibbous, clawed. **Stamens** monadelphous; staminal tube split along upper side to base; anthers unequal. **Ovary** subsessile, linear, several-ovuled, ciliate on sutures; style incurved, with minutely capitate, terminal stigma. **Pod** narrowly oblong to linear, slightly compressed between seeds. **Seeds** without an aril, on short funicles. $x = 14$ (can also be 7).

Species ± 5, Africa; all in sthn Afr., all countries/provinces except Northern and Western Cape.

Dichrostachys (A.DC.) Wight & Arn. 3452000

(Mimosoideae—Mimoseae)

Wight & Arnott: 271 (1834) name conserved; Harvey: 278 (1862); Brenan: 36 (1959); Brenan & Brummitt: 37 (1970); Ross: 123 (1975).

Shrubs or small trees, with abbreviated lateral shoots often terminating in spines. **Leaves** bipinnate, often with small, many-jugate leaflets; rachis glandular at intersection of some at least of the pinnae. **Flowers** sessile, in cylindric spikes on solitary or clustered, often drooping peduncles, upper bisexual, yellow, lower neuter, rosy or purple. **Calyx** campanulate, shortly 5-toothed or nearly truncate. **Corolla** campanulate; lobes 5, valvate, oblong, shorter than tube. **Stamens** 10, in bisexual flowers, shortly exserted; anthers with stalked glands. **Ovary** subsessile, compressed, villous, several-ovuled; style elongate, with terminal, truncate stigma. **Pod** linear, compressed, contorted, coriaceous, indehiscent or irregularly dehiscent along the sutures. **Seeds** compressed, ovoid to ellipsoid, smooth. $x = 14$ (can also be 7) (polyploidy).

Species ± 20, from Africa to Asia and Australia; 1 from sthn Afr., in warmer parts of Namibia, the four northern provinces, Swaziland and KwaZulu-Natal.

Dipogon Liebm. 3909010

(Papilionoideae—Phaseoleae—Phaseolinae)

Liebmann: 27 (1854); Harvey: 244 (1862); Verdcourt: 406 (1970b).

Voluble, perennial herbs, becoming woody below, thinly pubescent, glabrescent. **Leaves** pinnately 3-foliolate, petiolate, stipulate; leaflets ovate-acuminate, up to 50 mm long. **Flowers** bright purple, in short, dense racemes on peduncles longer than leaves. **Calyx** 5-lobed; lobes short and broad, ciliate. **Corolla** ± 10 mm long. **Style** channelled, bearded along its upper margin, strongly curved near base and apex in same direction, middle part gently curved in opposite direction. **Pod** falcate, ± 50 mm long. **Seeds** 4–6, blackish. $x = 11$.

Species 1: *Dipogon lignosus* (L.) Verdc. (= *Dolichos lignosus* L. and *D. gibbosus* Thunb.) Cape Peninsula (Western Cape) to near East London (Eastern Cape).

Dolichos L. 3910000

(Papilionoideae—Phaseoleae—Phaseolinae)

Linnaeus: 725 (1753); Phillips: 427 (1951); Hutchinson: 441 (1964); Verdcourt: 411 (1970b); Verdcourt: 674 (1971b).

Herbs or undershrubs, climbing, prostrate, or erect, sometimes with large woody rootstocks. **Leaves** pinnately, rarely digitately, 3-foliolate, stipulate. **Flowers** yellow or purple, in axillary or terminal racemes, subumbellate, fascicled, or solitary. **Calyx** with campanulate tube, 2-lipped; upper lip simple or 2-toothed; lower 3-lobed. **Petals**: vexillum often with inflexed auricles at base, subsessile or clawed; wings ± adhering to keel, clawed; keel usually strongly incurved, often beaked, but not twisted. **Stamens** diadelphous; anthers uniform. **Ovary** with basal disc, 2–many-ovuled; style swollen, glabrous or pubescent, with terminal, capitate stigma. **Pod** straight or arcuate, flattened, 2-valved. **Seeds** somewhat flattened, rarely with appendage. $x = 10$, 11 (aneuploids).

Species ± 60, mainly confined to Africa but extending to India and E Asia; ± 12 in sthn Afr., widespread.

Dumasia DC. 3861000

(Papilionoideae—Phaseoleae—Glycininae)

Candolle: 96 (1825c); Harvey: 234 (1862); Verdcourt: 513 (1971b).

Herbs, twining. **Leaves** pinnately 3-foliolate; leaflets ovate; stipules setaceous; stipels present. **Flowers** solitary, clustered, or in axillary racemes; bracts small. **Calyx** with cylindric or narrow tube, gibbous on upper side at base, with mouth obliquely truncate; lobes almost obsolete. **Petals**: vexillum elliptic-oblong, spurred or shortly eared on both sides at base of limb, with channelled claw; wings with long claw; keel somewhat adnate to wings, slightly incurved, with long claw. **Stamens** diadelphous; anthers uniform. **Ovary** subsessile, few- to many-ovuled, sometimes villous; style straight, dilated ± in middle or higher up and incurved above dilated portion, with terminal stigma. **Pod** subsessile, linear, falcate, tortulose, compressed. **Seeds** subglobose. $x = 10, 11$.

Species ± 8, Africa to Asia; 1 in sthn Afr.: *Dumasia villosa* DC. var. *villosa*, Mpumalanga to Swaziland, KwaZulu-Natal and SE Western Cape near Knysna.

Elephantorrhiza Benth. 3467000

(Mimosoideae—Mimoseae)

Bentham: 344 (1842); Harvey: 277 (1862); Phillips: 187 (1922); Burtt Davy: 331 (1932); Brenan: 19 (1959); Brenan & Brummitt: 23 (1970); Ross: 247 (1974); Ross: 138 (1975).

Unarmed small trees, shrubs or suffrutices, often with a greatly enlarged underground rootstock or a number of rootstocks. **Leaves** bipinnate; leaflets small, many-jugate, with midrib usually oblique; petioles eglandular. **Flowers** bisexual, shortly pedicelled in pedunculate racemes or subspikes. **Calyx** campanulate with 5 ovate lobes shorter than tube. **Petals** 5, valvate, free almost to base. **Stamens** 10, free, shortly exserted; anthers with minute, deciduous glands at apex. **Ovary** sessile or shortly stalked, many-ovuled; stigma terminal, small, hollow. **Pod** usually large and straight, flattened, somewhat woody, with sutures remaining closed, but long-persisting, rigid valves separating. **Seeds** compressed-orbicular.

Species ± 9, Africa south of the equator; 8 in sthn Afr., Namibia, the four northern provinces, Swaziland, KwaZulu-Natal.

Entada Adans. 3468000

(Mimosoideae—Mimoseae)

Adanson: 318 (1763) name conserved; Harvey: 276 (1862); Brenan: 9 (1959); Brenan: 13 (1970); Ross: 150 (1975).

Entadopsis Britton: 191 (1928).

Unarmed suffrutices or lianes. **Leaves** bipinnate, uppermost pair of pinnae often modified into tendrils; pinnae in 1–4 pairs, each with one to many pairs of leaflets; petioles eglandular. **Flowers** bisexual, in slender spikes,

sessile or shortly pedicellate. **Calyx** campanulate, shortly 5-toothed or nearly truncate. **Petals** 5, valvate, free, or slightly cohering, or fused to form a campanulate tube. **Stamens** 10, exserted, free or united at base; anthers tipped with deciduous apical gland. **Ovary** sessile or stalked, many-ovuled, glabrous; style terete; stigma terminal, small, hollow. **Pods** often very large (*E. rheedii*), straight or curved, compressed, coriaceous or woody, breaking up into 1-seeded, indehiscent portions. **Seeds** deep brown, smooth, ± compressed, orbicular in outline. $x = 14$ (can also be 7).

Species ± 20, fairly widespread in tropical parts; 3 in sthn Afr., Namibia and KwaZulu-Natal.

Eriosema (DC.) G.Don 3898000

(Papilionoideae—Phaseoleae—Cajaninae)

Don: 237 (1832) name conserved; Harvey: 258 (1862); Grear: 17 (1970); Verdcourt: 761 (1971b).

Perennial herbs suffrutices or shrubs, erect, prostrate, or rarely climbing. **Leaves** pinnately (1)3-foliolate, often exstipellate, resinous-dotted on lower surface, rarely above; stipules triangular or lanceolate, free or connate, leaf-opposed. **Flowers** pale pink, or yellow, or red and yellow, or red, orange and yellow, in axillary racemes, rarely solitary. **Calyx** with campanulate tube oblique at base, hairy, 5-lobed; lobes longer or shorter than tube, subequal, rarely 2 upper shortly connate. **Petals**: vexillum variously oblong or obovate, with deeply channelled claw, usually inflexed-eared; wings usually shorter than keel and partially adnate to it, usually eared and clawed; keel slightly incurved at apex, clawed. **Stamens** diadelphous, with vexillary filament curved or bulbous-kneed at base. **Ovary** sessile or stalked, usually with basal, cupular disc, usually 2-ovuled, villous; style usually slightly thickened above, with capitate stigma. **Pod** compressed, 2-valved, broadly oblong to rhomboidal, obliquely beaked, variously clothed with long hairs. **Seeds** (1)2, compressed, reniform or oblong; funicle attached to one end of hilum. $x = 11$.

Species ± 130, fairly cosmopolitan in tropical and subtropical regions; ± 36 in sthn Afr., widespread.

Erythrina L. 3870000

(Papilionoideae—Phaseoleae—Erythrinae)

Linnaeus: 706 (1753); Harvey: 236 (1862); Collett: 219 (1941); Codd: 507 (1955); Hennessy: 1 (1972); Hennessy: 2 (1991).

Shrubs, or trees, or suffrutices with enlarged subterranean rootstocks; usually armed with prickles; variously hirsute. **Leaves** pinnately 3-foliolate, deciduous; leaflets with a pair of glands at base, stipulate. **Flowers** usually in terminal or sometimes axillary racemes, showy, appearing before or with leaves, bracteate; bracts usually hairy, deciduous. **Calyx** with narrow to campanulate tube, 2-lipped or subtruncate, sometimes with tube cleft nearly to base, sometimes woolly-villous to puberulous. **Petals**: vexillum conduplicate-falcate, shortly clawed, sometimes minutely velvety; wings frequently curved, shortly clawed, sometimes eared at base; keel sometimes eared. **Stamens** monadelphous or diadelphous, but vexillary stamen united to staminal tube for varying lengths; anthers uniform. **Ovary** stalked, linear, many-ovuled, usually densely tomentose; style terete, incurved, sometimes hispid below; stigma small, terminal. **Pod** usually falcate, moniliform, compressed or subterete, constricted, armed with prickles. **Seeds** red or brown, elliptic, smooth. $x = 21$ (aneuploids, high polyploidy).

Species ± 100, fairly cosmopolitan in warm regions; 9 in sthn Afr., widespread, but not extending into central Northern or Western Cape.

Erythrophleum Afzel. ex G.Don 3471000

(Caesalpinioideae—Caesalpinieae)

Don: 424 (1832) name conserved; Hutchinson: 259 (1964); Brenan: 18 (1967); Ross: 10 (1977).

Unarmed trees. **Leaves** bipinnate, with 2–5 pairs of pinnae; leaflets usually large, leathery, often alternate, eglandular; stipules very small, soon deciduous. **Inflorescences** of pedunculate spike-like racemes usually ± aggregated into panicles; bracts very small, falling as or before flowers open. **Flowers** bisexual, irregular, 5-merous, small, shortly pedicelled. **Calyx** narrowly campanulate, with 5 ovate or tooth-like lobes shorter than tube. **Petals** 5, imbricate, arising on calyx tube, free, oblong to oblanceolate-spatulate, pubescent or tomentose. **Stamens** 10, free, equal or unequal, arising with petals; filaments sometimes hairy; anthers dorsifixed, dehiscing by longitudinal slits. **Ovary** stalked, many-ovuled, stipitate, tomentose or densely pubescent; style thick; stigma small, terminal, hollow, minutely ciliolate. **Pod** stipitate, ± oblong, flattened, straight or slightly curved, coriaceous to woody, dehiscing along one or both margins, usually 2–1-seeded. **Seeds** compressed, ovoid; testa pulpy. $x = 12, 14$.

Species ± 10, tropical and subtropical parts of Africa to Asia and N Australia; 2 in sthn Afr., N Namibia, the four northern provinces, Swaziland and KwaZulu-Natal.

Faidherbia A.Chev. 3446010

(Mimosoideae—Acacieae)

Chevalier: 876 (1934); Vassal: 170 (1981).

Acacia Mill. in part; Ross: 44 (1975).

Tall trees with rounded crown and spreading branches; stipules spinescent, in pairs, straight or slightly curved, greenish white with reddish brown tips when young. **Leaves** with adaxial gland 0; rachis subglabrous or puberulous, with a single conspicuous gland at junction of each of 2–10 pairs of pinnae; leaflets grey-green, 6–23 pairs per pinna, linear or linear-oblong to slightly ovate-oblong, apex rounded or subacute or mucronate. **Inflorescence** spicate, usually singly in axil of a leaf. **Flowers** bisexual, yellowish white to pale cream-coloured, sessile or minutely pedicellate. **Calyx** campanulate, 4- or 5-lobed or -toothed, glabrous to pubescent. **Corolla** 4- or 5-lobed, often a delicate pink inside basally, lobes divided almost to base, glabrous to pubescent. **Stamens** many; filaments shortly united into a tube at base; anthers eglandular. **Ovary** shortly stipitate, pilose; style glabrous or subglabrous. **Pod** bright orange to reddish brown, falcate or curled into a circular coil or variously twisted, indehiscent, thick, glabrous or very rarely puberulous. **Seeds** light to dark brown, elliptic-lenticular.

Species 1: *Faidherbia albida* (Del.) A.Chev., widespread in tropical and subtropical Africa; in sthn Afr.: Namibia, Botswana, Northern Province, Mpumalanga and N KwaZulu-Natal.

Flemingia Roxb. ex W.T.Aiton 3899000

(Papilionoideae—Phaseoleae—Cajaninae)

Aiton: 349 (1812) name conserved; Phillips: 425 (1951); Hutchinson: 422 (1964); Verdcourt: 805 (1971b).

Shrubs or herbs, erect, prostrate, or rarely scandent. **Leaves** digitately (1)3-foliolate, exstipellate, gland-dotted on lower surface; stipules striate, often caducous. **Flowers** greenish, yellowish white or pink, densely spicate-racemose or paniculate; bracts foliaceous or dry and narrow, persistent or caducous; bracteoles 0. **Calyx** with campanulate tube, 5-lobed; lobes longer than tube, often linear-acuminate, subequal or lowest the longest. **Petals**: vexillum with inflexed ears at base and channelled claw;

wings often adhering to keel; keel straight or incurved, clawed. **Stamens** diadelphous, with vexillary filament often kneed or broadened; anthers uniform. **Ovary** subsessile, ellipsoid, 2-ovuled, sometimes with basal, cupular disc; style often thickened above, with small, terminal stigma. **Pod** short, oblique, turgid, 2-valved. **Seeds** thick, globose; thick funicle attached to short hilum. $x = 11$ (aneuploids).

Species ± 30, tropical regions of Old World; 1 in sthn Afr.: *Flemingia grahamiana* Wight & Arn., Northern Province, Mpumalanga, Swaziland to KwaZulu-Natal.

Galactia P.Browne 3882000

(Papilionoideae—Phaseoleae—Diocleinae)
Browne: 298 (1756); Harvey: 235 (1862); Verdcourt: 578 (1971b).

Herbs, prostrate or climbing, or shrubs, sometimes villous. **Leaves** pinnately 3-foliolate, rarely 1- or 5- or 7-foliolate; stipules small, often deciduous. **Flowers** fascicled or lower subsolitary, in axillary racemes; bracts small, setaceous. **Calyx** often hairy, with campanulate tube; 2 upper lobes usually fused, lowest often the longest. **Petals**: vexillum ovate or round, shortly clawed; wings narrow, eared, shortly clawed, adnate to keel; keel shortly clawed. **Stamens** diadelphous, or vexillary stamen connate with others at middle; anthers uniform. **Ovary** sessile or shortly stipitate, several- to many-ovuled, often villous; style filiform, with small stigma. **Pod** linear to linear-oblong, straight or incurved, compressed, or rarely convex on both sides, 2-valved. **Seeds** small; hilum small, central, elliptic, not arillate or with a vestigial rim-aril. $x = 10$ (aneuploids).

Species ± 50, mostly New World, tropical and subtropical; 1 in sthn Afr.: *Galactia tenuiflora* (Willd.) Wight & Arn. var. *villosa* (Wight & Arn.) Benth., Mpumalanga, Swaziland and KwaZulu-Natal.

***Gleditsia** L. 3544000

(Caesalpinioideae—Caesalpinieae)
Linnaeus: 1056 (1753); Hutchinson: 266 (1964); Ball: 84 (1968).

Trees or shrubs, usually armed with stout straight or branched thorns. **Leaves** stipellate or not, usually all or partly bipinnate on long shoots, pinnate or bipinnate on short shoots; leaflets often ± serrate. **Flowers** small, greenish, effectively unisexual or plants polygamous with flowers in racemes or small panicles; bracteoles small or 0. **Calyx** campanulate with 3–5 lobes, subequal. **Petals** 3–5, sessile, slightly unequal, imbricate. **Stamens** 6–10; anthers uniform. **Ovary** in male flowers rudimentary, minute or 0, in bisexual flowers subsessile, free; ovules many to 2; style short; stigma terminal. **Pod** ovate or elongated, straight, compressed, coriaceous, indehiscent or tardily dehiscent, often pulpy within. **Seeds** many, transverse, obovate or orbicular, compressed. $x = 14$ (polyploidy).

**Gleditsia triacanthos* L., Honey or Sweet Locust, strongly spiny trees, cultivated and may be found as an escape.

***Glycyrrhiza** L. 3769000

(Papilionoideae—Galegeae—Glycyrrhizinae)
Linnaeus: 741 (1753); Hutchinson: 412 (1964); Yeo: 127 (1968).

Perennial herbs, often glandular or lepidote, some with sweet roots. **Leaves** imparipinnate; leaflets many, rarely 3, entire or glandular-denticulate, without stipels; stipules membranous, caducous. **Flowers** blue, violet, white, or rarely yellowish, in axillary racemes or spikes; bracts narrow, membranous, caducous; bracteoles 0. **Calyx** weakly bilabiate. **Petals**: vexillum narrowly ovate or oblong, erect, shortly contracted at base; wings obliquely oblong, rather acute, free; keel longer than wings, acute or obtuse. **Stamens** diadelphous or monadelphous; vexillary stamen free or connate with the rest into a sheath split above. **Ovary** sessile, 2- or more-ovuled; style filiform or rather thick, incurved at apex; stigma terminal. **Pod** ovate, oblong or shortly linear, straight or arcuate, turgid or compressed, glandular, muricate, bristly or rarely smooth, indehiscent or tardily 2-valved. **Seeds** reniform or subglobose. $x = 8$ (aneuploids).

Species ± 20, mostly in Eurasia but thinly extending to Australia, North America and temperate South America; 1 in sthn Afr.: **Glycyrrhiza glabra* L., has become naturalised in the Montagu District of the Western Cape and in the Middelburg and Graaff-Reinet Districts of the Eastern Cape.

Guibourtia Benn. 3490020

(Caesalpinioideae—Detarieae)
Bennett: 149 (1857); Léonard: 400 (1949) name emended; Léonard: 269 (1950); Hutchinson: 256 (1964); Brenan: 136 (1967); Ross: 19 (1977).

Unarmed evergreen or deciduous trees or shrubs. **Leaves** 2-foliolate; leaflets opposite, sessile, asymmetric, entire, rarely with a terminal leaflet, usually with many pellucid gland dots; stipules small, soon deciduous. **Flowers** bisexual, irregular, sessile or pedicellate, in more than 2 rows on branches, in terminal panicles; branches strobiliform when young; bracts mostly small, bracteoles 2, persistent or falling before flowers open. **Calyx** with 4 subequal sepals, imbricate. **Petals** 0. **Disc** present, ± fleshy. **Stamens** 8–12, free, alternately longer and shorter; anthers ovoid, dorsifixed. **Ovary** stalked or sessile, with 1–4 ovules; style filiform with terminal, capitate stigma. **Pod** ± stalked, suborbicular to obliquely elliptic, flat or dilated, coriaceous or membranous, dehiscent or indehiscent, unilaterally winged. **Seeds** 1 or 2, sometimes arillate. $x = 12$ (polyploidy).

Species 16, tropical Africa and America; 2 in sthn Afr., N Namibia and Northern Province.

Haematoxylum L. 3552000

(Caesalpinioideae—Caesalpinieae)
Linnaeus: 384 (1753); Schreiber: 14 (1967b); Ross: 112 (1977).

Trees or shrubs, unarmed or armed with spine-tipped abbreviated lateral shoots. **Leaves** simply paripinnate or with lower jugae bipinnate; a few leaflet pairs usually obcordate; stipules sometimes spinescent, sometimes caducous. **Inflorescence** an axillary or terminal raceme. **Flowers** bisexual, irregular. **Calyx** eglandular or sometimes covered with many small, stalked glands, with short, sometimes campanulate tube; lobes 5, imbricate slightly unequal, one boat-shaped. **Petals** 5, obovate or oblong, slightly unequal, imbricate. **Stamens** 10, free, sometimes unequal; filaments pilose at base; anthers often elliptic. **Ovary** shortly stalked, 2- or 3-ovuled; style with small, terminal, sometimes hollow stigma. **Pod** compressed, lanceolate or oblong, flattened, membranous, splitting longitudinally almost along middle of each valve. **Seeds** transversely oblong. $x = 12$.

Species 3, Africa, tropical America, India; 1 in sthn Afr.: *Haematoxylum dinteri* (Harms) Harms, Namibia.

Hallia Thunb. 3819000

(Papilionoideae—Psoraleeae)
Thunberg: 38 (1799); Harvey: 231 (1862); Hutchinson: 419 (1964); Stirton: 341 (1981b).

Low ascending or trailing suffrutices. **Leaves** 1-foliolate; exstipellate, simple, entire, often nigro-punctate or pellucid-dotted; stipules striate, adnate to base of petiole. **Flowers** purple, axillary, solitary, slen-

derly pedunculate or subsessile, aggregated in 1 or 5–18 triplets, or rarely doublets, axillary or terminal fascicles, imperfect racemes or lax pseudo-spikes; each flower bracteate and always subtended by a lobed cupulum, itself subtended by 2 bracts; bracteoles 0. **Calyx** campanulate; lobes equal, longer than tube, upper 2 lobes slightly connate, inner face without black stubby hairs (as in *Psoralea*). **Petals**: vexillum ovate, without appendages, auricles weak inflexed but weakly developed; wing oblong, longer than the obtuse keel. **Stamens** monadelphous. **Ovary** weakly substipitate, 1-ovuled. **Pod** compressed, thinly membranous and reticulated, enclosed by the calyx at maturity. **Seeds** unknown.

Species 9, endemic to the Western Cape.

Hoffmannseggia Cav. 3557000

(Caesalpinioideae—Caesalpinieae)
Cavanilles: tt. 392, 393 (1797); Harvey: 269 (1862); Brenan: 198, 202 (1963); Hutchinson: 261 (1964); Brummitt & Ross: 415 (1974); Ross: 117 (1977).

Herbs or undershrubs, often glandular, sometimes shortly spinescent, sometimes with tuberous roots. **Leaves** bipinnate, imparipinnate; leaflets usually small; stipules small, usually deciduous; stipellae, when present, small and setaceous. **Inflorescence** a terminal or leaf-opposed raceme; bracts small, deciduous; bracteoles 0. **Flowers** bisexual, irregular, pedicellate. **Calyx** with shortly campanulate tube and 5 subequal lobes longer than tube, imbricate or valvate, often with black glands. **Petals** 5, subequal, imbricate. **Stamens** 10, free; filaments somewhat declinate, often glandular at base, sometimes villous. **Ovary** subsessile, few- to many-ovuled; style often clavate, with terminal, usually small, concave or hollow stigma. **Pod** subsessile, linear, oblong or ovate, straight or falcate, longitudinally dehiscent, compressed, 2-valved, glandular or setose. **Seeds** compressed, transversely or obliquely ovate. $x = 12$.

Species ± 30, Central America and Africa; 3 in sthn Afr., widespread except in Mpumalanga, Swaziland, Free State, Lesotho and Western Cape.

Hypocalyptus Thunb. 3683000

(Papilionoideae—Liparieae)
Thunberg: 124 (1800a); Harvey: 81 (1862); Dahlgren: 102 (1972).

Shrubs, or rarely trees, up to ± 3(–6) m tall, generally stiff in habit. **Leaves** digitately 3-foliolate, petiolate, stipulate; leaflets oblanceolate to broadly obovate, entire. **Flowers** violet, 2 to more than 50 in terminal racemes or racemose panicles; bracts setaceous, usually caducous. **Calyx** brown, membranous, with campanulate tube, intruse at base; upper 2 lobes ± united to ± 1 mm from apices; lower lobes deltoid to narrowly triangular. **Petals**: vexillum broadly ovate, reflexed, shortly clawed, with callus on inner side of claw; wings oblong-spatulate, eared at base, with short claw bent at right angle to limb; keel incurved, shorter than vexillum, with rather prominent upper ear, shortly clawed. **Stamens** monadelphous; tube closed; anthers unequal, alternately versatile and basifixed. **Ovary** subsessile, curved, with few to many ovules, glabrous; style incurved, with small, capitate stigma. **Pod** linear, flat or sometimes somewhat inflated, 2-valved, with upper suture thickened. **Seeds** 5 or 6, dark, with a whitish, annular, collar-like strophiole. $x = 10$ (B-chromosomes).

Species 3; Western Cape: from Clanwilliam District to Bredasdorp and Riversdale and eastwards to Eastern Cape: Uitenhage and Port Elizabeth Districts.

Indigastrum Jaub. & Spach 3702030

(Papilionoideae—Indigofereae)
Jaubert & Spach: 101, t. 492 (1857); Schrire: 167 (1992); Schrire: 161 (1995).

Annual or perennial herbs, covered with biramous hairs. **Leaves** 1–17-foliolate; leaflets opposite or alternate, entire; stipules adnate to base of petiole, subulate or falcate-lanceolate. **Flowers** pink, in axillary, many-flowered racemes, dense initially, becoming lax later; bracts caducous. **Calyx** usually with shallowly campanulate tube; lobes equal or longer than the tube. **Petals**: vexillum narrow at base, tapering to the claw, glabrous; keel with lateral pouches, apex prolonged rostrate. **Stamens** diadelphous, all fertile; vexillary stamen free; anthers glabrous, hyaline scales at base reduced or 0. **Ovary** usually sessile; stigma oblique or capitate. **Pod** reflexed, 4–20-seeded, terete or laterally compressed, linear, straight or curved. **Seeds** quadrate.

Species ± 9, mostly south tropical Africa and one pantropical; 8 in sthn Afr., widespread.

Indigofera L. 3702000

(Papilionoideae—Indigofereae)
Linnaeus: 487 (1738); Linnaeus: 751 (1753); Harvey: 163 (1862); Phillips: 412 (1951); Gillett: 5 (1958); Hutchinson: 400 (1964).

Perennial or annual herbs, undershrubs, or shrubs, mostly covered by biramous hairs. **Leaves** (1)3(5–9)-foliolate, pinnate, simple or reduced to scales; leaflets opposite or less often alternate, entire; stipules setaceous to foliaceous; stipels often present. **Flowers** in axillary or terminal racemes or spikes, sometimes on long peduncles; bracts persistent or caducous. **Calyx** usually with shallowly campanulate tube; lobes equal or subequal. **Petals**: vexillum usually sessile, mostly hairy on dorsal surface; wings rarely markedly clawed, often eared, sometimes gibbous; keel with short, broad claw, spurred laterally or sometimes saccate, upper margin with a prominent fringe of hairs. **Stamens** diadelphous; vexillary stamen free; anthers uniform, apiculate. **Ovary** usually sessile, usually linear, with 1–many ovules; style usually bent at right angle, with capitate stigma. **Pod** variable, globose to linear, straight to coiled, septate within, variously hairy or glabrous. **Seeds** globose to cylindrical; either truncate, compressed, obloid, ellipsoid or quadrate; with hard, bony testa and a small, oval hilum; a rudimentary rim-aril is present in most taxa. $x = 8$ (7) (aneuploids, polyploidy, B-chromosomes).

Species ± 730, cosmopolitan in tropical and subtropical regions; over 210 in sthn Afr.; widespread.

Julbernardia Pellegr. 3516020

(Caesalpinioideae—Amherstieae)
Pellegrin: 297 (1943); Brenan: 145 (1967); Ross: 43 (1977).

Unarmed evergreen or deciduous trees. **Leaves** paripinnate; leaflets in one to many opposite pairs, ± markedly asymmetric basally, venation prominent on both surfaces, translucent dots often present but sometimes 0; petiolules usually twisted; stipules intrapetiolar, always connate below, bicuspidate above or with 2 relatively large foliaceous lobes simulating free stipules, ± persistent or rapidly deciduous. **Inflorescence** a terminal usually much-branched panicle. **Flowers** bisexual, irregular; bracteoles 2, well developed, valvate, completely enclosing flower buds, persistent, keeled down back. **Sepals** 5, well developed, equal or nearly so in length, ciliate; calyx tube 0. **Petals** 5, equal or nearly so in length, all subequal and well developed, 1 large and 4 small, or all small. **Stamens** 10, fertile; 9 filaments shortly united

below, the tenth free. **Ovary** very shortly stipitate, densely pubescent; stipe free; ovules up to 5; style elongate; stigmas capitate, abruptly enlarged. **Pod** compressed, 1-seeded, elastically dehiscing into 2 woody valves; valves obliquely transversely nerved; upper suture usually with a laterally projecting wing or ridge. **Seed** compressed, exareolate, with a hard testa, borne on short funicles. $x = 12$.

Species ± 8, all in tropical Africa; 1 in sthn Afr.: *Julbernardia globiflora* (Benth.) Troupin, Namibia (Caprivi Strip) and Botswana.

Kotschya Endl. 3796010

(Papilionoideae—Aeschynomeneae—Aeschynomeninae)

Endlicher: 4 (1839); Hutchinson: 475 (1964); Verdcourt: 410 (1971a); Verdcourt: 447 (1973).

Herbs, undershrubs, or shrubs, sometimes villous. **Leaves** impari- or paripinnate; leaflets alternate, asymmetric at base; stipules membranous or scarious, persistent; stipels 0. **Flowers** usually in axillary racemes, rarely solitary, bracteate. **Calyx** scarious, deeply 5-lobed, 2-lipped, upper lip entire or emarginate, lower lip entire to 3-fid. **Petals**: vexillum obovate or rounded, often emarginate, sometimes adnate to staminal tube, usually sessile; wings shortly clawed; keel incurved or straight, sometimes eared, clawed. **Stamens** monadelphous; tube split above, eventually on 2 sides; anthers uniform. **Ovary** sessile or stalked, 2–many-ovuled, usually submoniliform, sometimes with a cupular disc at base; style inflexed, glabrous, with small, terminal stigma. **Pod** within calyx, segmented, with segments at length separating. **Seeds** reniform. $x = 14$ (1 report).

Species ± 31, restricted to tropical Africa and Madagascar; 2 in sthn Afr.: *Kotschya parvifolia* (Burtt Davy) Verdc. and *K. thymodora* (Baker f.) Wild subsp. *thymodora*, the four northern provinces to KwaZulu-Natal and border of the Eastern Cape.

Lablab Adans. 3909000

(Papilionoideae—Phaseoleae—Phaseolinae)

Adanson: 325 (1763); Harvey: 263 (1862); Verdcourt: 409 (1970b); Verdcourt: 696 (1971b).

Herbs, erect or climbing. **Leaves** pinnately 3-foliolate; stipules reflexed, persistent; stipels lanceolate. **Flowers** in axillary racemes longer than leaves; rachis swollen at insertion of pedicels; bracts caducous. **Calyx** with campanulate tube longer than lobes, bilabiate; upper lip entire, emarginate, lower 3-lobed. **Petals**: vexillum usually reflexed, auriculate at base, with 2 callosities on inner face; wings longer than keel; keel beaked, incurved at right angle. **Stamens** 10, vexillary filament free, others connate into sheath; anthers uniform. **Ovary** surrounded by lobed disc; several-ovuled; style incurved at right angle, flattened laterally, with soft hairs towards top of adaxial face; stigma terminal. **Pod** obliquely oblong-falcate, beaked by persistent style, sometimes with upper margin verrucose. **Seeds** slightly compressed, dark brown, with a white aril more than half their length. $x = 11$.

Species 1, variable under world-wide cultivation; *Lablab purpureus* (L.) Sweet subsp. *uncinatus* Verdc., widespread in Africa, throughout sthn Afr.

Lebeckia Thunb. 3660000

(Papilionoideae—Crotalarieae)

Thunberg: 139 (1800b); Harvey: 82 (1862); Dahlgren: 255 (1963d); Dahlgren: 558 (1970).

Shrubs, undershrubs, or sometimes herbaceous, sometimes spinescent and not very leafy. **Leaves** variable, (1)3-foliolate, usually petiolate; leaflets filiform, linear, narrowly spathulate or obovate; stipules sometimes present and then conspicuous. **Flowers** few to many in terminal or unilateral racemes. **Calyx** usually obliquely campanulate; lobes equal or subequal, shorter than tube. **Petals**: vexillum broad, reflexed with bent, channelled claw, glabrous or pubescent on outside; wings oblong or obovate, often eared, sometimes with transverse ridges, clawed; keel usually planoconvex, often gibbous, sometimes saccate, clawed. **Stamens** monadelphous, with tube split to base; anthers unequal. **Ovary** sessile or stalked, usually linear, several- to many-ovuled; style incurved, with minutely capitate stigma. **Pod** dehiscent, many-seeded, sometimes membranous, usually tipped with persistent style. **Seeds** on short funicles. $x = 9$.

Species ± 35, sthn Afr., mainly Cape region, extending into Namibia and 1 in KwaZulu-Natal: *Lebeckia mucronata* Benth.

*__Lespedeza__ Michx. 3820000

(Papilionoideae—Desmodieae—Lespedezinae)

Michaux: 70, t. 39 (1803); Hutchinson: 487 (1964); Hilliard & Burtt: 127 (1970); Schrire: 19 (1988).

Perennial herbs; shrubs or shrublets; woody rhizomes bearing 1–many virgate, aerial stems. **Leaves** pinnately 3-foliolate; leaflets entire, often mucronate, terminal often longer than lateral ones; stipules often small, persistent. **Flowers** borne in pairs, each pair subtended by 2 series of bracts, second series usually paired; bracteoles 2, at base of calyx. **Calyx** campanulate, persistent in fruit, lobes subequal, upper 2 more connate than the others. **Petals**: vexillum clawed; wings falcate-oblong, free or scarcely adherent to keel; keel obtuse or beaked, not laterally appendaged. **Stamens** diadelphous; anthers uniform. **Ovary** 1-ovulate; style filiform, incurved, persistent in fruit; stigma small, terminal. **Pod** ovate or orbicular, reticulate, indehiscent. **Seeds** compressed, suborbicular. $x = 9, 10, 11$ (polyploidy).

Species ± 40, in temperate North America, east and tropical Asia and Australia; 1 in sthn Afr.: **Lespedeza cuneata* (Dum.Cours.) G.Don, has become naturalised in the midlands of KwaZulu-Natal in the Pietermaritzburg, Kokstad and Ixopo Districts.

Lessertia DC. 3756000

(Papilionoideae—Galegeae—Coluteinae)

Candolle: 37 (1802) name conserved; Harvey: 213 (1862); Bolus: 87 (1915).

Herbs, shrublets, or shrubs, rarely spinescent. **Leaves** imparipinnate, stipulate. **Flowers** in pedunculate, axillary racemes, rarely solitary and terminal, bracteate. **Calyx** with campanulate tube; lobes subequal. **Petals**: vexillum sometimes bilobed, sessile or shortly clawed; wings usually eared, clawed; keel straight or incurved, clawed. **Stamens** diadelphous; anthers uniform. **Ovary** sessile or stalked, 2–many-ovuled; style incurved, bearded in front below apex. **Pod** membranous, slightly inflated or compressed, opening at apex. **Seeds** reniform, with filiform funicle. $x = 8$.

Species over 50, Africa; ± 47 in sthn Afr., widespread.

*__Leucaena__ Benth. 3447000

(Mimosoideae—Mimoseae)

Bentham: 416 (1842); Brenan & Brummitt: 53 (1970); Ross: 193 (1973); Ross: 115 (1975).

Unarmed trees or shrubs. **Leaves** bipinnate, a conspicuous gland often present at junction of lowest pair of pinnae, petiole and rachis otherwise eglandular or rarely with glands between other pairs of pinnae; pinnae each with one to many pairs of leaflets. **Inflorescence** capitate, pedunculate, axillary, 1–3 together, often racemo-

sely aggregated. **Flowers** bisexual, sessile. **Calyx** gamosepalous, 5-toothed. **Petals** 5, free, pubescent or glabrous outside. **Stamens** 10, free, fertile; anthers mostly eglandular apically. **Ovary** pubescent or sometimes glabrous. **Pod** oblong or linear-oblong, usually thinly subcoriaceous, compressed, dehiscing into 2 nonrecurving valves. **Seeds** lying ± transversely in pod, compressed, brown, smooth, unwinged. x = 13, 14 (polyploidy, B-chromosomes).

Species ± 50; 1: **Leucaena leucocephala* (Lam.) De Wit, widespread in the tropics and subtropics, has become naturalised in KwaZulu-Natal and Eastern Cape.

Liparia L. 3642000

(Papilionoideae—Liparieae)

Linnaeus: 156 (1771); Harvey: 14 (1862); Bos: 269 (1967); Schutte & Van Wyk: 573 (1994); Schutte: 149 (1995).

Priestleya DC. sect. *Priestleya*.

Woody shrubs or shrublets, variable in habit. **Leaves** simple, variable, linear, lanceolate, elliptic, oblanceolate or cordate to almost round, pungent, palmately-nerved, often drying black; stipules usually present, small, persistent. **Flowers** usually yellow, 4–many, in terminal heads; bracts large, imbricate, clasping flowers; bracts large and conspicuous, sometimes foliaceous or petaloid; bracteoles 0. **Calyx** with shortly campanulate tube intruse at base; lobes longer than tube; 4 upper lobes lanceolate, acute, usually united for some distance; lower lobe longer than others, sometimes as large as vexillum, petaloid. **Petals**: vexillum usually elliptic-oblong, ovate to circular; keel broad with an upward-directed beak or narrow with a forwardly-directed beak, subacute. **Stamens** 10, diadelphous, unequal, vexillar stamen free, the other 9 connate in a dorsally open tube; anthers versatile, linear, ovate, or sometimes subsagittate. **Ovary** sessile or shortly stalked, few-ovuled, villous; style villous below, with small, terminal stigma. **Pod** coriaceous, ovate or oblong, flat, oblique, compressed, 2-valved, hairy, glabrescent. **Seeds** oblong-reniform, appendaged. x = 9.

Species ± 20, SW Western Cape and eastwards to Eastern Cape: Uitenhage and Port Elizabeth Districts.

Lonchocarpus Kunth 3834000

(Papilionoideae—Tephrosieae)

Kunth: 383 (1823) name conserved; Harvey: 263 (1862); Mendonça & Sousa: 831 (1965); Polhill: 65 (1971b).

Trees or rarely strong, woody climbers. **Leaves** imparipinnate, occasionally pinnately 3-foliolate. **Flowers** in racemes or panicles or sometimes fascicled, or 2-nate, bracteate; bracteoles small, usually caducous. **Calyx** sometimes villous, with campanulate tube; lobes 5, shorter than tube with 2 upper lobes connate almost to tips. **Petals**: vexillum ovate, obovate or suborbicular, cuneately clawed, sometimes with 2 appendages above claw, often silky; wings oblique or falcate, clawed, eared, slightly adnate to keel above claw; keel suberect or curved, obtuse, eared, clawed, sometimes gibbous. **Stamens** monadelphous, with vexillary stamen free at base and connate above, rarely entirely free; anthers uniform. **Ovary** ± stalked, 2–many-ovuled, frequently hairy; style incurved, with small, terminal, capitate stigma. **Pod** oblong or linear-oblong, flat, membranous or leathery, indehiscent, with terminal style scar; sutures not winged, sometimes upper laterally dilated. **Seeds** 1 or 2, rarely many, compressed, reniform or suborbicular. x = 11 (polyploidy).

Species ± 100, in tropical America and Africa; 3 in sthn Afr., Namibia, Botswana, the four northern provinces to KwaZulu-Natal.

Lotononis (DC.) Eckl. & Zeyh. 3657000

(Papilionoideae—Crotalarieae)

Ecklon & Zeyher: 176 (1836) name conserved; Harvey: 47 (1862); Dümmer: 275 (1913); Dahlgren: 371 (1964); Van Wyk: 92 (1991).

Buchenroedera Eckl. & Zeyh.: 194 (1836).

Annual, perennial suffrutescent herbs or small shrubs. **Leaves** alternate or rarely opposite, usually petiolate, digitately 3(4–8)-foliolate, rarely simple or 1-foliolate; stipules small or foliaceous, usually single at each node, less commonly paired or 0. **Flowers** usually yellow (often partly orange, pink or white) or blue, rarely pink, pale purple, violet or white, axillary or terminal, usually solitary, sometimes 2- or 3-nate, or in heads, or sometimes head-like racemes, often pedunculate, usually bracteate. **Calyx** with campanulate tube, occasionally somewhat inflated; 4 upper lobes substantially united, lowest narrower than others, rarely lobes subequal. **Petals**: vexillum ovate to oblong with short or long claw, sometimes with 2 cushions at upper end of claw, glabrous or hairy outside; wings sometimes shorter than keel, clawed, eared at base; keel clawed, eared at base, usually gibbous. **Stamens** monadelphous, unequal, usually with tube split to base, open along upper (vexillar) side, rarely much united; anthers usually unequal, 4 oblong to linear and basifixed, 5 ovate and dorsifixed, carinal one intermediate. **Ovary** sessile or shortly stalked, few- to many-ovuled; style curved up and tapering, occasionally hairy towards base, with minutely capitate stigma. **Pod** subsessile or rarely long-stipitate, flat or turgid, linear to oblong or ovate. **Seeds** on long funicle, suborbicular to obliquely cordiform. x = 9, 14 (polyploidy).

Species ± 150, Africa, with few extending to east tropical Africa, the Mediterranean and Pakistan: 144 in sthn Afr., widespread.

Lotus L. 3698000

(Papilionoideae—Loteae)

Linnaeus: 773 (1753); Harvey: 157 (1862); Gillett: 361 (1958b); Gillett: 1042 (1971a).

Annual or perennial herbs, or softly woody undershrubs. **Leaves** 3-foliolate, with 1 or 2 leaflets near stem resembling stipules; stipules minutely tuberculate or 0. **Flowers** in axillary umbels, rarely solitary; bracts 3-bracteolate. **Calyx** variable; lobes equal, or subequal, or rarely calyx 2-lipped. **Petals** free or sometimes adnate to base of calyx tube; vexillum sessile or clawed; wings sometimes eared, clawed and gibbous; keel incurved or inflexed, beaked, gibbous. **Stamens** diadelphous, vexillary stamen free, alternate filaments expanded at apex. **Ovary** sessile or subsessile, many-ovuled; style inflexed above ovary, with terminal or lateral sometimes capitate stigma. **Pod** oblong or linear, straight or curved, terete, turgid, rarely planocompressed, 2-valved, usually septate within. **Seeds** subglobose or lenticular. x = 6, 7 (aneuploids, polyploidy, B-chromosomes).

Species ± 100, fairly cosmopolitan; 1 in sthn Afr.: *Lotus discolor* E.Mey. subsp. *discolor*, the four northern provinces, Swaziland, KwaZulu-Natal and Eastern Cape; several other species introduced and rare as escapes.

***Lupinus** L. 3672000

(Papilionoideae—Genisteae—Lupininae)

Linnaeus: 721 (1753); Hutchinson: 364 (1964); Franco & Da Silva: 105 (1968); Polhill: 995 (1971a); Stirton: 25 (1988).

Annual or perennial herbs, rarely shrubs. **Leaves** usually digitately 5–11(–17)-foliolate; stipules mostly linear-subulate, adnate to base of petiole. **Flowers** variously coloured, usually many in terminal and leaf-opposed racemes, alternate to verticillate; bracteoles often at-

tached to calyx. **Calyx** deeply divided almost to base, bilabiate, 3 lower lobes, at least, largely joined. **Petals**: vexillum with a short claw and broad blade; wings broad, generally enveloping keel, connate at apex; keel beaked. **Stamens** monadelphous; anthers alternately long and short. **Ovary** usually sessile, 2–many-ovulate; style incurved, glabrous except for a ring of hairs beneath terminal stigma. **Pod** dehiscent, compressed, usually constricted between seeds. **Seeds** generally orbicular-rectangular to oblong-elliptic, with a sunken hilum. $x = 8$ (9, 10, 13) (polyploidy).

Species ± 200, most numerous in the western parts of North and South America, with a second centre in Mediterranean Europe with some extensions in the highlands of E Africa. Species of **Lupinus* are extensively used in the Western Cape as a cover crop or green manure and 4 species have become naturalised.

Macrotyloma (Wight & Arn.) Verdc. 3910020

(Papilionoideae—Phaseoleae—Phaseolinae)
Verdcourt: 400 (1970b); Verdcourt: 322 (1970d); Verdcourt: 1 (1982).

Annual or perennial herbs, often with large woody rootstocks; stems erect, scrambling, or prostrate. **Leaves** pinnately 3-foliolate or sometimes unifoliolate; leaflets often with a margin of whitish hairs; stipulate. **Flowers** axillary, fasciculate or in terminal pseudoracemes. **Calyx** 4- or 5-lobed; tube campanulate; 2 uppermost lobes ± united. **Corolla** glabrous, yellow or greenish yellow, often blotched with mauve, rarely reddish; vexillum rounded or elliptic, eared, with 2 small, parallel appendages; wings narrow. **Stamens** biseriate, with uniform anthers. **Ovary** 3–13-ovuled; style ± filiform, with terminal, subcapitate, often penicillate stigma. **Pod** straight or curved, linear or linear-oblong, compressed. **Seeds** compressed, with small or obsolete aril. $x = 11$ (aneuploids).

Species ± 24, Africa and Asia; 6 in sthn Afr., widespread, but not reaching Western Cape.

**Medicago* L. 3688000

(Papilionoideae—Trifolieae)
Linnaeus: 778 (1753); Harvey: 162 (1862); Stirton: 27 (1982).

Herbs, rarely shrubs. **Leaves** pinnately 3-foliolate, veins of leaflets usually extended into teeth on margin; stipules entire, dentate, incised or laciniate. **Flowers** yellow, purple, mauve or pale lilac, in axillary racemes or heads, or sometimes subsolitary; bracts small or 0. **Calyx** with campanulate tube; lobes longer than tube. **Petals**: vexillum sessile; wings oblong, eared, clawed; keel shorter than wings, obtuse, with a linear claw. **Stamens** diadelphous, with vexillary stamen free; filaments with uniform anthers. **Ovary** sessile or subsessile, sometimes twisted, sometimes papillose, (1)- several- to many-ovuled; style variable, with oblique, subcapitate stigma. **Pod** spirally falcate, often spiny, often hooked, or somewhat curved and unarmed. **Seeds** ovoid, slightly reniform, partitioned or nonpartitioned, pale yellow to yellow-brown. $x = 7, 8, 9$ (high polyploidy).

Species ± 50, Europe, except for northernmost part, Africa, and Asia; often naturalised in warm climates; 4 naturalised in sthn Afr., widespread.

Melilotus Mill. 3689000

(Papilionoideae—Trifolieae)
Miller: [876] (1754); Adanson: 322 (1763); Harvey: 161 (1862); Henderson & Anderson: 182 (1966); Gillett: 1039 (1971a).

Herbs annual or biennial, often strongly scented. **Leaves** pinnately 3-foliolate, veins of leaflets usually extended into teeth on margin; stipules adnate to petiole; leaflets toothed. **Flowers** yellow or white, small in slender or abbreviated, axillary racemes; bracts minute or 0. **Calyx** with campanulate tube; lobes variable. **Petals**: vexillum sessile, glabrous; wings oblong, eared at base, clawed; keel ± planoconvex, obtuse, clawed. **Stamens** diadelphous, with vexillary stamen free or partly connate with rest; anthers uniform. **Ovary** sessile or subsessile, 2–few-ovuled; style straight or incurved, with terminal stigma. **Pod** small, subglobose or ovoid, indehiscent or tardily 2-valved, longer than calyx. **Seeds** solitary or few, often ± kidney-shaped. $x = 8, 9$ (high polyploidy).

Species ± 20, temperate and subtropical regions of Europe, Asia and North Africa. 3 species have become naturalised and are widespread near cultivated lands.

Melolobium Eckl. & Zeyh. 3665000

(Papilionoideae—Crotalarieae)
Ecklon & Zeyher: 188 (1836); Harvey: 77 (1862).

Shrubs or undershrubs, often spinescent, glandular-villous or viscid. **Leaves** petiolate, digitately 3-foliolate; stipules often foliaceous, semisagittate or semicordate at base. **Flowers** usually small, in short, terminal spikes or racemes; bracts often foliaceous. **Calyx** with campanulate tube, shortly or deeply 2-lipped; upper lip bipartite; lower lip trifid or 3-toothed, glandular or hairy, rarely glabrous. **Petals**: vexillum with a channelled claw; keel planoconvex, sometimes gibbous, shorter than wings and vexillum, clawed; wings clawed. **Stamens** monadelphous; tube split to base; anthers unequal. **Ovary** sessile or shortly stalked, with 1 to several ovules; sometimes glandular or hairy; style incurved; stigma terminal, capitate. **Pod** linear or oblong, compressed, often torulose, usually glandular or villous, 2-valved. **Seeds** on short funicles. $x = 8, 9$ (polyploidy).

Species ± 20, in sthn Afr., widespread, prominent in arid parts.

Microcharis Benth. 3746000

(Papilionoideae—Indigofereae)
Bentham: 501 (1865); Schrire: 165 (1992); Schrire: 161 (1995).

Annual or perennial herbs covered with biramous hairs, hyaline or yellowish; pearl bodies restricted to leaf bases and between leaflets. **Leaves** 1–9(–13)-foliolate or simple; leaflets opposite, entire; stipules adnate to base of petiole, subulate, deltoid, falcate-lanceolate or broadly cordate. **Flowers** pink, in axillary or terminal, laxly 3–15-flowered racemes; bracts persistent. **Calyx** with campanulate tube, ± half or more as long as staminal sheath; lobes longer than the tube. **Petals**: vexillum narrow at base, tapering to the claw, glabrous; keel with lateral pouches; spurs 0. **Stamens** diadelphous; vexillary stamen free. **Ovary** usually sessile, more than half the horizontal length of the pistil; style short, thick, widened and laterally compressed at base; stigma oblique, discoid. **Pod** linear, laterally compressed, straight or curved, patent to erect, held at right angle to pedicel. **Seeds** 10–30, quadrate.

Species ± 35, Africa, Madagascar and Arabian Peninsula; 3 in sthn Afr., widespread.

Millettia Wight & Arn. 3720000

(Papilionoideae—Tephrosieae)
Wight & Arnott: 263 (1834); Harvey: 211 (1862); Gillett: 122 (1971b).

Trees or shrubs, sometimes scandent. **Leaves** imparipinnate, 2–several-jugate; leaflets entire, usually opposite; stipellae usually present; stipules small, often caducous; a pulvinus usually present at base of rachis. **Flowers** white, pink, blue or violet, in terminal racemes or pani-

cles. **Calyx** campanulate, somewhat 2-lipped or truncate; 2 upper lobes sometimes subconnate. **Petals**: vexillum conspicuous with oblong claw, sometimes with a callus, or eared at base, silky-pubescent or glabrous; wings falcate-ovate, often with broad claw, eared; keel incurved, obtuse, usually clawed, sometimes eared. **Stamens** monadelphous or diadelphous, sometimes free; anthers uniform. **Ovary** sessile or occasionally stalked, pubescent, often linear, few- to many-ovuled; style inflexed, with small, subcapitate stigma. **Pod** linear, lanceolate, oblong or obovate, compressed, coriaceous or woody, 2-valved, but often very tardily dehiscent, glabrous, hairy or velvety. **Seeds** sometimes solitary, orbicular, or reniform. $x = 8, 10, 11, 12$ (polyploidy, B-chromosomes).

Species nearly 100, cosmopolitan in tropical and subtropical regions; 2 in sthn Afr., N KwaZulu-Natal to the Eastern Cape.

Mimosa L. 3449000

(Mimosoideae—Mimoseae)

Linnaeus: 516 (1753); Brenan: 42 (1959); Brenan & Brummitt: 47 (1970); Ross: 117 (1975).

Herbs, shrubs, rarely scandent, or trees, usually armed with prickles. **Leaves** bipinnate, rarely undeveloped or petiole forming a phyllode, often sensitive; glands sometimes present on petiole. **Flowers** bisexual or unisexual with few bisexual, in globose heads or cylindric spikes on axillary, solitary or fascicled peduncles, (3)4–5(6)-merous. **Calyx** usually small, rarely campanulate. **Corolla** tubular, often campanulate, with linear lobes. **Stamens** free, as many as corolla lobes or twice as many or more, exserted; **Ovary** usually sessile, 2–many-ovuled; style filiform, sometimes oblique on ovary, with small, terminal stigma. **Pod** usually compressed, sometimes transversely articulated, margins persisting as an empty frame, densely setose. **Seeds** compressed, ovate or suborbicular. $x = 13$ (aneuploids, high polyploidy).

Species ± 500, widely distributed through the tropics but the vast majority of species found in South America; 1 in sthn Afr.: *Mimosa pigra* L., on northern flood plains of Namibia and N KwaZulu-Natal, and one species: **Mimosa pudica* L. var. *hispida* Brenan has become naturalised.

Mucuna Adans. 3877000

(Papilionoideae—Phaseoleae—Erythrinae)

Adanson: 325 (1763) name conserved; Hutchinson: 433 (1964), Hennessy: 17 (1991).

Stizolobium P.Browne: 290 (1756).

Woody lianes or herbaceous climbers. **Leaves** pinnately 3-foliolate, stipulate. **Flowers** maroon, cardinal red, lilac or green, fairly conspicuous in axillary racemes; bracts small, sometimes caducous. **Calyx** often hairy, with campanulate tube; 2 upper lobes connate, and lowest longer than 2 laterals. **Petals**: vexillum ovate-orbicular, sessile, folded together, shortly clawed, eared at base with ears often upturned; wings incurved, sessile, eared, often adhering to keel; keel sessile, incurved at apex or rostrate, equalling or longer than wings, eared. **Stamens** diadelphous; alternate filaments sometimes swollen at apex; anthers unequal. **Ovary** sessile or stipitate, few-ovuled, surrounded by a cupular disc at base, villous; style filiform, incurved, often hairy with small, terminal stigma. **Pod** thick, ovate, oblong or linear, 2-valved, septate, often covered with stinging hairs. **Seeds** round or transversely oblong. $x = 11$ (polyploidy).

Species ± 100, cosmopolitan in warm regions; 3 in sthn Afr., Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Mundulea (DC.) Benth. 3719000

(Papilionoideae—Tephrosieae)

Bentham: 248 (1852); Harvey: 204 (1862); Burtt Davy: 358 (1932); Gillett: 155 (1971b).

Shrubs or small trees, silky-pubescent; bark corky, smooth or fissured. **Leaves** imparipinnate; leaflets entire, reticulately veined and usually widest below middle; stipules small, subulate. **Flowers** bluish purple, in terminal or axillary racemes; bracts small. **Calyx** with campanulate tube, somewhat 2-lipped, with 2 upper lobes subconnate. **Petals**: vexillum silky outside, with short, curved claw, with callus at base; wings falcate-oblong, slightly adhering to keel, eared, clawed; keel somewhat resembling wings, gibbous, clawed. **Stamens** monadelphous, with vexillary stamen free at base; anthers uniform. **Ovary** subsessile, linear, many-ovuled; style incurved, with small capitate stigma. **Pod** linear, compressed. **Seeds** reniform. $x = 11$.

Species ± 15, all Madagascan except 1 in sthn Afr.: *Mundulea sericea* (Willd.) A.Chev. (= *M. suberosa* in *Flowering Plants of Africa*, 11, t. 406 (1931)), Namibia, Botswana, the four northern provinces, Swaziland, KwaZulu-Natal and Northern Cape.

Neonotonia J.A.Lackey 3864010

(Papilionoideae—Phaseoleae—Glycininae)

Lackey: 210 (1977) .

Glycine Willd.: 1053 (1802).

Perennial climbers or trailers, often woody at base; rootstock often thick and woody. **Leaves** pinnately 3-foliolate; leaflets ovate or elliptic, laterals somewhat oblique, glabrous to densely velvety on both surfaces; stipules ovate or oblong-lanceolate. **Flowers** small, white, in 20–150-flowered, sometimes racemose inflorescences, bracteate. **Calyx** with campanulate tube, sparsely to densely hairy; lobes linear-lanceolate, ± as long as tube; 2 upper lobes ± connate. **Petals**: vexillum oblate, rounded or rhomboid, sessile or shortly clawed, sometimes subauricled at base; wings narrow, slightly adnate to keel, eared, clawed; keel obtuse, broader than wings, clawed, sometimes gibbous. **Stamens** monadelphous or occasionally ± diadelphous; anthers uniform. **Ovary** subsessile few- to many-ovuled, sometimes villous; style slightly incurved; stigma terminal, capitate. **Pod** linear, sometimes falcate, often reflexed, glabrous to densely hairy with adpressed or spreading hairs, compressed or becoming subterete, 2-valved, septate between seeds. **Seeds** oblong, somewhat compressed, reddish or orange-brown; aril white. $x = 11$ (polyploidy).

Species 1, *Neonotonia wightii* (Arn.) Lackey (= *Glycine wightii* (Arn.) Verdc. subsp. *wightii* var. *longicauda* (Schweinf.) Verdc.) from Africa to Asia; in sthn Afr. widespread except in the Free State and the Cape region.

Neorautanenia Schinz 3865000

(Papilionoideae—Phaseoleae—Phaseolinae)

Schinz: 35 (1899); Hutchinson: 441 (1964); Verdcourt: 388 (1970b).

Perennial herbs, erect or prostrate, with subsimple stems, sometimes with tuberous root up to 600 mm in diameter. **Leaves** pinnately 3-foliolate; leaflets sometimes lobed, often apiculate, hairy; stipules lanceolate. **Flowers** in few- to many-flowered racemes, ebracteate. **Calyx** hairy, with campanulate tube, 5-lobed; lobes longer than tube, 2 upper lobes united further than rest, lowest sometimes 2-lobed. **Petals**: vexillum eared at base, with linear, often channelled claw; wings oblong, slightly adnate to keel, eared, clawed; keel planoconvex, with linear claw, sometimes eared. **Stamens** diadelphous or monadelphous; anthers equal. **Ovary** sessile, linear,

with few to several ovules, hairy; style somewhat linear, curved, with a boss or other thickening at base; style with terminal, capitate stigma. **Pod** oblong, septate, sometimes densely tomentose. **Seeds** elliptic, dark brown with white hilum. $x = 11$.

Species 3, Africa; 2 in sthn Afr.: *Neorautanenia amboensis* Schinz and *N. ficifolius* (Benth.) C.A.Sm., widespread except in Swaziland, KwaZulu-Natal and Cape region.

Neptunia Lour. 3451000

(Mimosoideae—Mimoseae)
Loureiro: 653 (1790); Brenan: 40 (1959); Brenan & Brummitt: 45 (1970); Ross: 121 (1975).

Diffuse undershrubs, or perennial herbs, sometimes aquatic. **Leaves** bipinnate, frequently sensitive; leaflets small; stipules membranous, obliquely cordate, persistent or deciduous; petiolar glands rare. **Flowers** in globose heads on solitary, axillary peduncles, with some reduced to male and some neuter. **Calyx** campanulate, shortly 5-dentate. **Petals** 5, coherent to middle or free. **Stamens** (5)10, free; anthers crowned by a stipitate gland. **Ovary** stipitate; ovules many; style filiform with concave stigma. **Pod** oblong, deflexed, plano-compressed, 2-valved, subseptate between seeds within or rarely 1-seeded, dehiscent. **Seeds** transversely ovate, compressed, with filiform funicle. $x = 14$ (aneuploids, polyploidy).

Species 11, fairly cosmopolitan in tropical regions; 1 in sthn Afr.: *Neptunia oleracea* Lour., tropical swamps of Namibia, the northern provinces and N KwaZulu-Natal.

Newtonia Baill. 3460000

(Mimosoideae—Mimoseae)
Baillon: 721 (1888); Brenan: 180 (1955); Brenan: 23 (1959); Brenan & Brummitt: 28 (1970); Ross: 134 (1975).

Unarmed trees. **Leaves** bipinnate; rachis usually with a gland between each pair of opposite pinnae; pinnae each with one to many pairs of leaflets. **Flowers** bisexual, many, sessile or nearly so, small, in slender spike in terminal panicles; bracts minute. **Calyx** gamosepalous, 5-toothed, pubescent or puberulous outside, sometimes on margins only. **Petals** 5, free, separated from gynophore base by a short perigynous zone, pubescent or puberulous outside, sometimes on margins only. **Stamens** 10, alternately longer and shorter; filaments wrinkled in bud; anthers tipped by a small, stipitate, globular, fugaceous gland. **Ovary** many-ovuled, densely pilose outside. **Pod** broadly linear, compressed, straight or somewhat curved, at maturity dehiscing along one of the margins, valves remaining attached along the other, splitting neither transversely nor into layers. **Seeds** flattened, oblong, surrounded by a membranous wing, elongated lengthwise in direction of pod. $x = 13$ (1 report).

Species ± 14, tropical Africa and America; 1 in sthn Afr.: *Newtonia hildebrandtii* (Vatke) Torre; on sandy soils in tropical forests of N KwaZulu-Natal.

Ophrestia H.M.L.Forbes 3718020

(Papilionoideae—Phaseoleae—Ophrestiinae)
Forbes: 1003 (1948a); Verdcourt: 257 (1970a); Verdcourt: 524 (1971b).

Perennial herbs, branched from base, with slightly flexuous, ascending or procumbent stems. **Leaves** subsessile to petiolate, 1–5-jugate; stipules slender, linear to linear-subulate; leaflets ± elliptic-oblong, apex obtuse to acute, sometimes retuse, midrib with 5–7 lateral nerves on each side, nerves prominent below, impressed above, looping back and not forming a marginal nerve. **Flowers** mauve, in axillary racemes, rarely clusters, with peduncles sometimes longer than leaves. **Calyx** usually densely hirsute, somewhat 2-lipped; tube campanulate, slightly oblique at base; lobes ovate to lanceolate, with 2 uppermost connate beyond halfway. **Petals**: vexillum mainly oblong, with channelled claw and 2 ears at junction of claw and limb; wings broadly linear, clawed, sometimes eared; keel ± planoconvex in outline, clawed and sometimes eared. **Stamens** monadelphous; anthers uniform. **Ovary** linear; style short, hooked; stigma capitate. **Pod** ± oblanceolate. **Seeds** oblong-ovoid; hilum short, central; rim-aril developed, cartilaginous. $x = 10$, 11 (1 report).

Species ± 13, Africa and Asia; 1 variable species in sthn Afr.: *Ophrestia oblongifolia* (E.Mey.) H.M.L.Forbes, the four northern provinces, Swaziland, KwaZulu-Natal and Eastern Cape.

Ormocarpum P.Beauv. 3792000

(Papilionoideae—Aeschynomeneae—Ormocarpinae)
Beauvois: 95, t. 59 (1810) name conserved; Hutchinson: 473 (1964); Gillett: 323 (1966); Verdcourt: 361 (1973).

Shrubs or small trees, often glutinous, sometimes harshly setose. **Leaves** imparipinnate, leaflets many; stipulate. **Flowers** solitary or in few-flowered, axillary racemes. **Calyx** with broadly campanulate tube; lobes longer than tube, 2 upper lobes connivent or shortly connate, lowest the longest. **Petals**: vexillum with curved claw; wings clawed; keel incurved, clawed. **Stamens** monadelphous; staminal tube often splitting to give 2 bundles of 5; anthers uniform. **Ovary** sessile, stalked, several- to many-ovuled; style inflexed, with terminal stigma. **Pod** linear, compressed, constricted into 2 or more indehiscent segments. **Seeds** light brown, ± elliptic, compressed. $x = 10$, 12, 13 (1 report each).

Species ± 20, in tropical parts of Old World and Africa; 2 in sthn Afr.: *Ormocarpum kirkii* S.Moore and *O. trichocarpum* (Taub.) Engl., northern parts of Namibia, the four northern provinces to KwaZulu-Natal.

*__Ornithopus__ L. 3773000

(Papilionoideae—Coronilleae)
Linnaeus: 743 (1753); Hutchinson: 464 (1964); Ball: 182 (1968).

Slender annual herbs. **Leaves** imparipinnate; leaflets many, small, exstipellate; stipules lateral, linear, small or membranous. **Flowers** very small, in axillary heads or umbels, subtended or not by a floral leaf; bracts and bracteoles small. **Calyx** tubular or campanulate; lobes subequal or upper 2 connate high up. **Petals**: vexillum obovate or orbicular; wings oblong; keel obtuse, almost straight, shorter than wings or very short. **Stamens** diadelphous; vexillary stamen free, remainder connate, alternate filaments dilated above; anthers uniform. **Ovary** sessile, many-ovuled; style inflexed; stigma capitate. **Pod** linear, compressed or subterete, arcuate, usually constricted between segments. **Seeds** transversely oblong, ovate or subglobose. $x = 7$, 8 (polyploidy).

Species ± 6, in Europe, Mediterranean region, W Asia, Atlantic Islands and South America; 1 in sthn Afr.: *__Ornithopus sativus__ Brot. has become naturalised in the Western Cape.

Otholobium C.H.Stirt. 3703040

(Papilionoideae—Psoraleeae)
Stirton: 341 (1981b); Stirton: 1 (1986).

Shrubs, suffrutices or rarely decumbent herbs. **Leaves** 3-foliolate; petiolate; leaflets oblanceolate, obovate, cuneate, entire, acute or obtuse, recurved mucronate, nigro-punctate or pellucid-dotted; stipules striate, ovate, acute or subulate-acuminate, pubescent, free or adnate to

base of petiole. **Flowers** white, yellow or pale blue, sessile or subsessile, aggregated in 1 or 5–18 triplets, or rarely doublets, axillary or terminal fascicles, imperfect racemes or lax pseudo-spikes; each flower bracteate; triplets subtended by a single, ovate bract; cupulum 0. **Calyx** campanulate, unequally 5-lobed; lowest lobe much longer and broader than the rest; upper lobes variously connate, very rarely stubby black-haired on inside. **Petals**: vexillum ovate-oblong, claw and auricles weakly developed, without appendages; wing petals much longer than keel; sculpturing lamellate; keel long-clawed, purple-tipped, obtuse. **Stamens** diadelphous; vexillary stamen usually free; anthers uniform, alternately basifixed and medifixed. **Ovary** sessile, 1-ovulate, glabrous and glandular, or hairy; style swollen; stigma capitate, penicillate or glabrous. **Pod** swollen, indehiscent, slightly beaked, pubescent, protruding from calyx at maturity. **Seeds** black, longer than broad.

Species over 40, mainly restricted to SE and E Africa, but also extending into the winter-rainfall region of South Africa.

Otoptera DC. 3906000

(Papilionoideae—Phaseoleae—Phaseolinae)
Candolle: 249, t. 42 (1825b); Harvey: 239 (1862); Burtt Davy: 421 (1932); Hutchinson: 430 (1964); Schreiber: 93 (1970).

Shrubs with long, trailing branches. **Leaves** glaucous, pinnately 3-foliolate; leaflets lanceolate, apiculate; stipules lanceolate, produced downwards at base; stipels paired, persistent. **Flowers** blue, paired at top of axillary peduncles; bracts subulate-lanceolate; bracteoles 2, close to calyx. **Calyx** with broadly campanulate tube, 4-lobed; 2 upper lobes fused. **Petals**: vexillum clawed with callosities at base of limb; wings and keel nearly as long as vexillum, auriculate at base of limb. **Stamens** with vexillary filament adnate for basal one-third; anthers uniform, dorsifixed, versatile. **Pod** linear, turgid, dehiscent, valves curling when ripe, with spongy tissue between seeds. **Seeds** several, oblong, kidney-shaped, with small hilum in middle.

Species 2, Africa; 1 in sthn Afr.: *Otoptera burchellii* DC. (= *Vigna burchellii* (DC.) Harv.), Namibia, Botswana, North-West, Northern Province and Northern Cape.

***Paraserianthes** I.C.Nielsen 3443010

(Mimosoideae—Ingeae)
Nielsen *et al.*: 352 (1983).

Unarmed trees or shrubs. **Leaves** bipinnate; rachis and pinnae with a conspicuous gland just below junction of top pinna pair; stipules linear or filiform, caducous. **Inflorescence** of pedunculate spikes or racemes, axillary. **Flowers** bisexual, pedicellate, usually pubescent, subtended by bracts. **Calyx** gamosepalous, 5-valvate. **Corolla** gamopetalous, 5-valvate. **Stamens** many, united into a tube at base; anthers quadrangular, minute, opening by two slits. **Ovary** solitary. **Pod** chartaceous, flat, straight, not segmented, dehiscent along both sutures. **Seeds** subcircular-elliptical to oblong, flat to convex.

**Paraserianthes lophantha* (Willd.) I.C.Nielsen subsp. *lophantha*, introduced from Australia and now naturalised, particularly in the southern Cape region along the coast from the Cape Peninsula to Humansdorp.

Parkinsonia L. 3551000

(Caesalpinioideae—Caesalpinieae)
Linnaeus: 375 (1753); Harvey: 269 (1862); Hutchinson: 264 (1964); Ross: 109 (1977) ; Schreiber: 16 (1967b); Brenan: 43 (1967).

Small trees or shrubs, not climbing, armed with spines or unarmed, eglandular. **Leaves** at first pinnate, later bipinnate, with common petiole sometimes flattened, often ending in a spine; leaflets opposite or partly alternate, small or obsolete; stipules often short, spinescent. **Inflorescences** in axillary racemes which are sometimes corymbose and short. **Flowers** bisexual, irregular. **Calyx** with campanulate or basin-shaped tube and 5 lobes ± imbricate. **Petals** 5, spreading, sometimes unequal, and claw of longest with appendage. **Stamens** 10, rarely fewer, free; filaments alternately longer and shorter, often flattened, villous at least at base; anthers elliptic. **Ovary** free, shortly stalked, many-ovuled; style glabrous or clothed below, with terminal and hollow or slightly oblique stigma. **Pod** linear to ± elliptic, nearly straight or twisted, sub-2-valved, sometimes constricted between seeds. **Seeds** oblong, hard, compressed. $x = 7, 9$.

Species ± 14, restricted mainly to warm parts of America; 1 in sthn Afr.: *Parkinsonia africana* Sond., Namibia and Northern Cape.

Pearsonia Dümmer 3657010

(Papilionoideae—Crotalarieae)
Dümmer: 353 (1912); Polhill: 383 (1974).

Phaenohoffmannia Kuntze: 940 (1891b). *Pleiospora* Harv.: 51, t. 81 (1859).

Perennial herbs or shrublets; usually tawny-silky. **Leaves** sessile, digitately 3-foliolate, sometimes almost sessile; stipules linear to foliaceous or lacking. **Flowers** yellow, white or purplish, in congested or lax, axillary or terminal racemes or spikes, bracteate. **Calyx** hairy, 5-lobed; tube campanulate; 4 upper lobes in pairs, lowest the narrowest. **Petals**: vexillum usually shortly clawed, ± elliptic to oblong-obovate; wings obliquely obovate or oblong, clawed, usually transversely ridged; keel straight with relatively small limb or gibbous, clawed. **Stamens** monadelphous, unequal; tube split to base; anthers subequal. **Ovary** sessile, several- to many-ovuled, hairy; style straight with terminal or suboblique stigma. **Pod** sessile, ovate- or oblong-lanceolate, somewhat laterally compressed, 2-valved, beaked, villous. **Seeds** 1–many, with short funicle.

Species ± 7, Africa; mostly sthn Afr.: the four northern provinces, E Free State, Swaziland and KwaZulu-Natal.

Peltophorum (Vogel) Benth. 3561000

(Caesalpinioideae—Caesalpinieae)
Bentham: 75 (1840) name conserved; Walpers: 811 (1842); Harvey: 270 (1862); Hutchinson: 262 (1964); Verdoorn: t. 1434 (1964); Ross: 130 (1977).

Unarmed trees. **Leaves** bipinnate; up to 21 pairs of pinnae; leaflets small, many, opposite; stipules small, caducous. **Inflorescence** a raceme; racemes often ± aggregated and panicled; bracts usually linear-lanceolate and caducous. **Flowers** bisexual, irregular. **Calyx** with shortly campanulate tube, 5 lobes imbricate, subequal, longer than tube. **Petals** 5, subequal, upper one often shorter than the others, ± spathulate, strongly imbricate. **Stamens** 10, free, declinate; filaments pilose at base, sometimes glandular; anthers versatile. **Ovary** sessile or shortly stalked, 2–many-ovuled; style with broadly peltate stigma. **Pod** narrowly elliptic to oblong, compressed, with a distinct wing along each margin, indehiscent. **Seeds** 1 or 2(3 or 4), compressed, ± winged. $x = 7, 13$ (polyploidy).

Species ± 15, cosmopolitan in tropical regions; 1 in sthn Afr.: *Peltophorum africanum* Sond., Namibia, Botswana, Northern Province, North-West, Mpumalanga, Swaziland and N KwaZulu-Natal.

Piliostigma Hochst. 3528010

(Caesalpinioideae—Cercideae)
Hochstetter: 598 (1846) name conserved; Milne-Redhead: t. 3460 (1947); Brenan: 206 (1967); Coetzer & Ross: 58 (1977).

Deciduous trees, small or shrubby, not climbing, dioecious or rarely monoecious. **Leaves** simple, deeply bi-

lobed, cordate basally. **Inflorescence** a terminal, axillary or leaf-opposed raceme. **Flowers** unisexual, rarely bisexual, irregular. **Calyx** with turbinate tube and 4 or 5 short, acute lobes. **Petals** 5, subequal. **Stamens** 10, fertile in male flowers, reduced to staminodes in female flowers; filaments villous below; anthers dehiscing by longitudinal slits. **Ovary** many-ovuled, stalked; stigma sessile, thick, capitate, flattened-globose; funicle several times as long as ovule. **Pod** linear to oblong, leathery or woody, indehiscent. **Seeds** irregularly arranged, embedded in pulp. $x = 12, 13, 14$ (polyploidy).

Species 3, Africa to Asia and Australia; 1 in sthn Afr.: *Piliostigma thonningii* (Schumach.) Milne-Redh., N Namibia, Northern Province and Mpumalanga.

Podalyria Willd. 3621000

(Papilionoideae—Podalyrieae)

Willdenow: 501 (1799); Lamarck: illustr. t. 327, fig. 3 & 4 (1793) & descr.: 454, 471 (1823); Harvey: 9 (1862).

Shrubs, silky-pubescent or villous. **Leaves** alternate, simple, linear and recurved to suborbicular. **Flowers** 1 or 2(3 or 4)-nate on axillary peduncles. **Calyx** shaggy, with shallow tube intruse at base, sometimes split on one side; lobes unequal, longer than tube. **Petals**: vexillum suborbicular or oblong-obovate, often bilobed, with a deeply concave, linear claw, purple, pink or white; wings elliptic, oblong, obovate, or obovate-oblong, with a curved, linear claw; keel usually convex on one margin and straight on the other, with a straight, flat claw. **Stamens** 10, connate at base; filaments usually flattened at base. **Disc** various. **Ovary** villous or shaggy; ovules 6–18 in 2 rows; style glabrous at base, with small, capitate stigma. **Pod** ovoid or oblong. **Seeds** with fleshy, collar-like aril. $x = 9$.

Species ± 25, mainly SW Western Cape, extending eastwards into KwaZulu-Natal.

Polhillia C.H.Stirt. 3660020

(Papilionoideae—Crotalarieae)

Stirton: 167 (1985); Van Wyk: 42 (1992).

Small, erect, much-branched shrubs up to 1.5 m tall. **Leaves** digitately 3-foliolate, shortly petiolate; stipules involucrate, adnate to petiole, completely sheathing twigs and clasping the stem. **Flowers** pale to deep golden-yellow, 1 or 2(–4), terminal on short shoots; bracts small, linear-lanceolate; ebracteolate. **Calyx** shorter than corolla, 2-lipped; upper lobes separate or somewhat united, triangular; lower lip formed from fusion of lateral and carinal lobes into a lip with 3 short teeth, fusion of lobes higher than vexillar lobes. **Petals**: vexillum broadly ovate, apex rounded or emarginate, claw less than half as long as blade; wing petals and keel petals ± equally long, both slightly pocketed, sculpturing upper basal and upper central or upper basal left central, intercostal, lunulate, becoming diffuse in patches or lunulate-lamellate. **Stamens** monadelphous; staminal tube split adaxially, consisting of 5 linear-oblong, basifixed anthers alternating with 5 ovate dorsifixed anthers. **Ovary** sessile or subsessile, compressed, densely hairy, 7–10-ovuled; style curving gently upwards to a small capitate stigma. **Pod** chartaceous, subsessile, narrowly oblong, sometimes slightly curved, plicate or flattened and impressed between seeds, indehiscent. **Seeds** dull, khaki to dark brown. $x = 8$ (1 report, polyploidy).

Species ± 7, endemic to the Western Cape.

*__Prosopis__ L. 3454000

(Mimosoideae—Mimoseae)

Linnaeus: 10 (1767); Hutchinson: 289 (1964); Burkart: 219 (1976).

Trees or shrubs of varying size, rarely subshrubs, spiny or rarely unarmed. **Leaves** bipinnate, with few pairs of opposite pinnae; petiole with circular, sessile, apical gland and sometimes smaller, similar ones on rachis of pinnae; leaflets small, many, mostly opposite, linear, oblong, fusiform. **Inflorescence** spike-like, axillary, sometimes with globose heads. **Flowers** bisexual, small. **Calyx** campanulate, 5-merous. **Corolla** with 5 linear petals, these fused or ± free, glabrous or pubescent, frequently villous or pilose inside towards tip. **Stamens** 5 + 5, free; anthers elliptic, dorsifixed, introrse, with an apical, pedicellate, globose or ovoid connectival gland. **Pods** linear, straight, falcate, annular to spirally coiled. **Seeds** ovoid, compressed, hard, brown. $x = 13, 14$ (high polyploidy).

Species ± 44, SW Asia, Africa, and predominantly America; **Prosopis chilensis* (Molina) Stuntz (Mesquite) and 3 other species have been introduced and have become naturalised.

Pseudarthria Wight & Arn. 3808000

(Papilionoideae—Desmodieae—Desmodiinae)

Wight & Arnott: 209 (1834); Harvey: 229 (1862); Hutchinson: 399 (1964); Schrire: 17 (1988).

Perennial, erect to suberect, woody herbs or subshrubs, arising from a thick rhizomatous, woody rootstock; tomentose-villous with white or yellow hairs. **Leaves** pinnately 3-foliolate; stipules lanceolate-attenuate. **Flowers** pink, racemose, sometimes panicled, bracteate. **Calyx** with campanulate tube; 2 upper lobes connate. **Petals**: vexillum orbicular, sometimes cuneate; wings free, eared and shortly clawed; keel obtuse, eared, clawed. **Stamens** diadelphous; anthers uniform. **Ovary** subsessile or stalked, many-ovuled, usually hairy; style subulate, inflexed, with terminal stigma. **Pod** linear-oblong or slightly falcate, compressed, with sutures straight or slightly sinuate, imperfectly articulated. **Seeds** compressed, reniform or oblong-ovoid, smooth, brown to khaki. $x = 11, 13, 17$ (1 report each).

Species ± 6, from sthn Afr. into Asia, Madagascar, Mauritius and Réunion; 1 in sthn Afr.: *Pseudarthria hookeri* Wight & Arn. var. *hookeri*, Northern Province, North-West, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Psoralea L. 3703000

(Papilionoideae—Psoraleeae)

Linnaeus: 762 (1753); Harvey: 143 (1862); Forbes: 116 (1930); Salter: 45 (1939a).

Small trees, shrubs or suffrutices, usually glandular with prominent blackish red glands, especially on calyx. **Leaves** digitately (1)3–many-foliolate and 3–5-pinnate, or rarely reduced to scales; leaflets entire; stipules stem-clasping, adnate to petiole. **Flowers** axillary, fasciculate, 1–5, each with or without a bract but always subtended by a lobed cupulum which itself is subtended by 2 free bracts; bracteoles 0. **Calyx** with campanulate tube and sometimes 2-lipped. **Petals**: vexillum orbiculate, clawed, often with inflexed sides, rarely with 2 callosities near base; wings subfalcate, longer than the keel, usually eared, clawed; keel incurved, sometimes eared, clawed, with darker patch at tip. **Stamens** diadelphous or occasionally monadelphous; vexillary stamen usually free, arching over ovary chamber. **Ovary** distinctly stipitate 1-ovulate, glabrous with a few scattered recurved club-headed glands; style glabrous, often filiform, usually thickened above, with terminal, subcapitate stigma. **Pod** usually ovate, indehiscent, included within calyx at maturity. **Seeds** black, on short funicle. $x = 10, 11$ (aneuploids).

Species ± 20, endemic to sthn Afr., mainly restricted to the Western Cape but a few extending as far north as KwaZulu-Natal and Swaziland.

Pterocarpus Jacq. 3828000

(Papilionoideae—Dalbergieae)

Jacquin: 283, t. 183/192 (1763); Harvey: 264 (1862); Polhill: 81 (1971b).

Evergreen or deciduous trees. **Leaves** alternate, imparipinnate, stipulate; leaflets few to many, alternate to subopposite; stipules caducous. **Flowers** usually yellow to orange, often large, in lax, axillary or terminal racemes or panicles, bracteate. **Calyx** with campanulate tube; lobes 5, shorter than tube, 2 upper lobes ± connate. **Petals**: vexillum orbicular or broadly ovate, with broad claw; wings eared, clawed. **Stamens** monadelphous, or staminal tube split into 2 bundles, rarely diadelphous; anthers equal, with longitudinal dehiscence. **Ovary** sessile or stalked, 2–6-ovuled, sometimes hairy; style almost straight to shortly incurved, with small stigma. **Pod** compressed, indehiscent, orbicular or ovate, or sometimes oblong, ± oblique at base, usually with a hardened central seed-bearing part, with membranous wing or sharp ridge, sometimes mainly coriaceous or membranous; style lateral, rarely terminal, glabrous or setose at middle. **Seeds** 1–3, reniform or oblong-reniform, smooth. $x = 8, 9, 10, 11$ (polyploidy).

Species ± 20, pantropical in forests and wooded grassland; 3 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Mpumalanga, Swaziland and KwaZulu-Natal.

Pterolobium R.Br. ex Wight & Arn. 3553000

(Caesalpinioideae—Caesalpinieae)

Wight & Arnott: 283 (1834) name conserved; Salt: 64 (1814) name only; Hutchinson: 261 (1964); Brenan: 40 (1967); Ross: 114 (1977).

Trees or scandent shrubs, armed with recurved prickles on stems and leaves. **Leaves** bipinnate; leaflets opposite, many, small; stipules small or obsolete. **Inflorescences** of terminal and axillary, often paniculately aggregated, racemes; bracts small, soon deciduous. **Flowers** bisexual, irregular. **Calyx** with shallow, basin-shaped tube and 5 imbricate lobes longer than tube. **Petals** 5, imbricate, sometimes slightly unequal. **Stamens** 10, sometimes unequal, longer than petals, usually villous at base; anthers ± quadrate. **Ovary** free, very shortly stipitate, 1-ovuled; style short or elongated and clavate, with truncate or concave, terminal stigma. **Pod** red, sessile, compressed and samaroid, indehiscent, seed-bearing base obliquely ovate or elliptic, upper part produced into an oblique-oblong or falcate, membranous wing. **Seeds** pendulous, compressed, without endosperm.

Species ± 10, cosmopolitan in tropical regions; 1 in sthn Afr.: *Pterolobium stellatum* (Forssk.) Brenan, Northern Province and Mpumalanga.

Ptycholobium Harms 3717010

(Papilionoideae—Tephrosieae)

Harms: 591 (1915); Brummitt: 24 (1965); Schreiber: 98 (1970).

Sylitra E.Mey.: 114 (1836).

Undershrubs, finely canescent, sometimes with deep taproot. **Leaves** 1-foliolate or sometimes digitately 3-foliolate; stipules small. **Flowers** small, usually in pairs, axillary; bracts small or 0. **Calyx** usually with campanulate tube, somewhat 2-lipped. **Petals**: vexillum not markedly clawed; wings adnate to keel, eared, clawed; keel shorter than wings, planoconvex, obtuse, clawed. **Stamens** monadelphous, with vexillary stamen free at base. **Ovary** sessile, many-ovuled; style inflexed, terete, with terminal, capitate stigma. **Pod** oblong, compressed, membranous, sometimes contorted and densely hairy. **Seeds** suborbicular on short, filiform funicle.

Species 3, Africa; all in sthn Afr., widespread except along eastern seaboard.

***Pueraria** DC. 3889000

(Papilionoideae—Phaseoleae—Glycininae)

Candolle: 97 (1825d); Hutchinson: 426 (1964); Van der Maesen: 9 (1985).

Climbers or shrubs with woody, rarely herbaceous stems. **Leaves** pinnately 3-foliolate; leaflets large, ovate or rhomboid, entire, scalloped or palmately lobed; stipules caducous or not. **Flowers** white or mostly purplish or blue, (2)3 or 4–7 per node, in an elongate pseudoraceme; bracts narrow, early caducous; bracteoles small, subpersistent or minute and caducous. **Calyx** campanulate with 5 teeth; upper teeth halfway to entirely connate. **Petals**: vexillum appendaged with inflexed auricles; wings narrowly oblong or obovate-falcate, often adherent to the middle of the keel; keel sometimes beaked, subequal to wings. **Stamens**: vexillary stamen connate, at least in middle with the others, rarely quite free; anthers uniform. **Ovary** elongate, subsessile, many-ovuled, pubescent; style filiform or on a broadened base, glabrous except near ovary; stigma globular, short-papillose, often penicillate. **Pod** hairy or glabrous, elongated, 2-valved, continuous or septate within. **Seeds** compressed, oblong to suborbicular, minutely punctate. $x = 11, 12$ (polyploidy).

Species ± 20, Asia; 1 in sthn Afr., **Pueraria lobata* (Willd.) Ohwi var. *lobata* (Kudzu vine), has become naturalised in Mpumalanga.

Rafnia Thunb. 3654000

(Papilionoideae—Crotalarieae)

Thunberg: 144 (1800b); Harvey: 31(1862).

Shrubs, shrublets, sometimes with single stems from perennial rootstocks, often glaucous. **Leaves** simple, alternate, rarely opposite. **Flowers** yellow, solitary, or in short, axillary or terminal racemes, or sometimes capitate; bracts foliaceous or 0. **Calyx** with campanulate tube, usually with lowest lobe narrowest, rarely lobes subequal. **Petals**: vexillum suborbicular, sometimes bilobed, subsessile or clawed; wings falcate-oblong or oblong, clawed; keel incurved, clawed, sometimes gibbous. **Stamens** monadelphous, unequal; tube usually long; anthers unequal, linear and elliptic. **Ovary** sessile or stalked, 2–many-ovuled, glabrous; style incurved with small, capitate stigma. **Pod** linear or lanceolate, compressed. **Seeds** estrophiolate.

Species ± 22, sthn Afr., mostly Western Cape from Clanwilliam, extending eastwards through Eastern Cape into KwaZulu-Natal.

Requienia DC. 3718010

(Papilionoideae—Tephrosieae)

Candolle: 91 (1825e); Harvey: 230 (1862); Hutchinson: 396 (1964).

Perennial herbs, branching from a woody rootstock; stems moderately branched, tomentose. **Leaves** unifoliolate; leaflet obcordate or narrowly elliptic, tomentose, closely penninerved, mucronate, stipulate. **Flowers** small, pink or purple, axillary, solitary or clustered. **Calyx** 5-fid; tube campanulate; lobes acute, the lowest the longest, persistent. **Petals**: vexillum obovate; carina obtuse; keel obtuse. **Stamens** monadelphous; tube cleft above. **Ovary** sessile, 1-ovulate; style short, incurved. **Pod** oval, compressed, mucronate.

Species ± 3, Africa; 2 in sthn Afr., Namibia, the four northern provinces, Free State, KwaZulu-Natal and Northern Cape.

Rhynchosia Lour. 3897000

(Papilionoideae—Phaseoleae—Cajaninae)

Loureiro: 400 (1790); Harvey: 247 (1862); Baker: 113 (1921); Mcikle: 537 (1972) name resubmitted for conservation.

Chrysoscias E.Mey.: 139 (1836).

Herbs or undershrubs, twining, prostrate or rarely erect, sometimes with woody rootstock. **Leaves** usually pinnately 3-foliolate, sometimes digitately (1)3-foliolate, or pinnate, or bipinnate; leaflets usually with very conspicuous resinous gland-dots beneath, stipulate. **Flowers** frequently yellow, lined with brownish purple, in racemes, axillary umbels, dense subsessile clusters, or solitary; bracts caducous. **Calyx** usually hairy, with short, campanulate tube, 5-lobed; lobes usually longer than tube; 2 upper connate, often more so than others. **Petals**: vexillum usually eared at base, with short channelled claw; wings ± oblong, eared, with straight or curved claw; keel usually gibbous, sometimes saccate, clawed. **Stamens** diadelphous, with vexillary filament often kneed; anthers uniform. **Ovary** subsessile, linear, lanceolate or ovate, frequently with basal, cupular disc, sometimes glandular, usually with (1)2 ovules; style linear, subterete, or filiform, usually hairy on lower portion, curved and thickened in upper portion and with terminal, capitate stigma. **Pod** almost circular to narrowly oblong, compressed, often falcate, frequently glandular and velvety. **Seeds** black or brown, rarely dark blue. $x = 11$ (aneuploids).

Species ± 200, cosmopolitan throughout the tropics and subtropics; ± 70 in sthn Afr., widespread.

***Robinia** L. 3733000

(Papilionoideae—Robinieae)

Linnaeus: 722 (1753); Hutchinson: 370 (1964); Ball: 106 (1968).

Deciduous trees or shrubs. **Leaves** imparipinnate; leaflets entire, reticulate-pinnately nerved; stipels often present; stipules spinescent. **Flowers** white or rose-purple, in pendent, axillary racemes; bracts membranous, early caducous; bracteoles 0. **Calyx** campanulate; teeth short, broad, upper 2 subconnate. **Petals**: vexillum large, reflexed; wings falcate-oblong, free; keel incurved, obtuse. **Stamens** diadelphous; vexillary stamen free at base, connate in middle with the others into a closed tube or at length free; anthers uniform. **Ovary** stipitate, many-ovuled; style inflexed, subulate, hairy at apex; stigma small, terminal. **Pod** linear or oblong, flat and compressed, dehiscent. **Seeds** oblong or kidney-shaped. $x = 10, 11$.

Species 10(–20), with only 4 or 5 basic species, America and Europe; 1 in sthn Afr.: **Robinia pseudoacacia* L., Gauteng, Mpumalanga, E Free State and KwaZulu-Natal.

Rothia Pers. 3659000

(Papilionoideae—Crotalarieae)

Persoon: 638 (1807) name conserved; Hutchinson: 361 (1964); Milne-Redhead: 811 (1971).

Herbs, annual, diffuse, prostrate or spreading, pilose. **Leaves** digitately 3-foliolate; stipules small or foliaceous, solitary or in pairs. **Flowers** solitary or 1–5 in short racemes opposite leaves; bracts and bracteoles setaceous. **Calyx** with campanulate tube; lobes narrow, subequal, upper 2 broader and falcate. **Petals**: vexillum ovate or oblong; wings narrow; keel similar to wings. **Stamens** monadelphous, with somewhat split sheath; anthers small, uniform. **Ovary** sessile, many-ovuled; style straight, glabrous, with terminal stigma. **Pod** oblong, linear or linear-lanceolate, acute, inflated or scarsely so, when mature gaping along adaxial suture. **Seeds** many, on short, filiform funicle. $x = 6, 7$.

Species 2, Africa to India and Australia; 1 in sthn Afr.: *Rothia hirsuta* (Guill. & Perr.) Baker, N Namibia and Northern Province.

Schotia Jacq. 3506000

(Caesalpinioideae—Detarieae)

Jacquin: 93 (1787) name conserved; Harvey: 273 (1862); Codd: 515 (1956); Hutchinson: 240 (1964); Ross: 23 (1977).

Unarmed trees or shrubs. **Leaves** paripinnate; leaflets usually in 3–18 pairs, coriaceous, lower usually smaller than upper; stipules small, deciduous. **Inflorescence** a short lateral or terminal panicle or raceme, sometimes produced from old wood, many-flowered. **Flowers** bisexual, red or pink; bracts caducous. **Calyx** turbinate or subcampanulate, with 4 imbricate lobes longer than tube, persisting in fruit. **Petals** 5, or, in *S. brachypetala*, some or all petals reduced to linear filaments, arising in mouth of calyx tube, somewhat unequal, imbricate. **Stamens** 10, arising with petals, free or connate at base. **Ovary** somewhat unequal-sided, with stalk adnate to calyx tube, many-ovuled; style terete, with terminal, capitate stigma. **Pod** often woody, oblong or broadly linear, often falcate, sometimes beaked, compressed, with a hard margin or wing along upper suture, which persists, often with seeds attached, poorly dehiscent. **Seeds** compressed-orbicular, with funicle small or sometimes expanded into a fleshy, cup-like aril. $x = 12$.

Species ± 5, restricted to Africa south of the Zambesi River; 4 in sthn Afr., Namibia, the four northern provinces, Swaziland, KwaZulu-Natal and through Eastern Cape to Riversdale area in Western Cape.

Senna Mill. 3536020

(Caesalpinioideae—Cassieae)

Miller: [1280] (1754); Irwin & Barneby: 105 (1981).

Trees, shrubs, perennial or annual herbs. **Leaves** paripinnate; extrafloral nectaries often present on leaf stalks or raceme axes or both, verruciform, claviform or phalloid, secretory surface convex. **Inflorescence** a 1–many-flowered raceme, primitively axillary, often becoming corymbose-paniculate towards end of branchlets or rarely cauliflorous; bracteoles 0. **Petals** 5, yellow, exceptionally white, either subiso- or strongly heteromorphic, vexillar one interior in bud. **Stamens** 5–10, straight filaments shorter than or not over twice as long as basifixed anther, when less than 10 stamens fertile then whole set accrescent toward abaxial side of flower, adaxial ones dwindling to staminodes, perfect anthers either truncate, obliquely produced into a pollen cup, or beaked, lateral sutures glabrous, their dehiscence terminal by pore or short slit. **Pod** terete, 4-angulate, turgid, or plano-compressed, sometimes winged lengthwise along either sutures or valves; valves varying from papery to coriaceous or ligneous, cavity often transversely septate, seeds 1- or rarely 2-seriate, oriented either transversely or basipetally; indehiscent or tardily dehiscent along ventral suture, or through both sutures, but valves never coiling. **Seeds** not punctate. $x = 7$ (can also be 14, polyploidy).

Species ± 240, circumtropical, most numerous in the Americas, well represented in Africa and Australia; 5 species indigenous in sthn Afr., others have become naturalised.

Sesbania Scop. 3747000

(Papilionoideae—Robinieae)

Scopoli: 308 (1777) name conserved against *Sesban* Adans.: 326 (1763); Harvey: 212 (1862); Gillett: 91 (1963); Gillett: 330 (1971b).

Herbs, shrubs, or small, slender trees. **Leaves** paripinnate; leaflets usually in more than 10 pairs, oblong, entire, often unequal-sided at base, stipulate. **Flowers** yellow, in racemes or panicles, rarely solitary or 2, bracteate. **Calyx** with widely campanulate tube; lobes often

subequal. **Petals**: vexillum nearly always streaked or spotted with purple, clawed, with 2 free or adnate appendages at base; appendages rarely 0; wings clawed, sometimes eared; keel with claw ± equal to limb. **Stamens** diadelphous; anthers uniform. **Ovary** sessile or stalked, many-ovuled, sometimes pilose with soft spreading hairs; style incurved, with small, capitate stigma. **Pod** linear or sometimes oblong, compressed, 4-angled or -winged, 2-valved or subindehiscent, usually septate within. **Seeds** 8–50, ellipsoid, oblong or subquadrate. $x = 6, 7, 8$ (aneuploids, polyploidy).

Species over 50, cosmopolitan in warm parts, generally in seasonally or permanently wet places; ± 18 in sthn Afr., widespread from Namibia and the four northern provinces into KwaZulu-Natal, Free State and Northern Cape.

Smithia Aiton 3796000

(Papilionoideae—Aeschynomeneae—Aeschynomeninae)

Aiton: 496, t.13 (1789) name conserved; Verdcourt: 15 (1970c); Verdcourt: 408 (1971a); Verdcourt: 445 (1973).

Erect or decumbent herbs or shrublets. **Leaves** pinnate; leaflets in 6–12 pairs, opposite, asymmetric at base, stipulate; stipules conspicuous, appendaged at base, with appendage 2-auricled, one ear rounded and short, the other linear and longer, persistent. **Flowers** in short, dense, axillary, scorpioid cymes; bracts entire, scarious, brownish, caducous, with persistent bracteoles below calyx. **Calyx** 2-lipped. **Petals**: vexillum ± orbicular; keel petals united dorsally, free at apex. **Stamens** 10, alternately long and short, united into a tube for two-thirds, split above. **Ovary** shortly stipitate, with 2–9 ovules; style inflexed, glabrous; stigma terminal. **Pod** enclosed within accrescent calyx, jointed; joints indehiscent. **Seeds** reniform. $x = 19$.

Species ± 30 in Old World tropics, a few in Africa; 1 in sthn Afr.: *Smithia erubescens* (E.Mey.) Baker f., the four northern provinces, Swaziland, KwaZulu-Natal and the N Eastern Cape.

Sophora L. 3602000

(Papilionoideae—Sophoreae)

Linnaeus: 373 (1753); Harvey: 265 (1862); Brummitt & Gillett: 259 (1966); Polhill: 43 (1971b).

Trees, shrubs, or rarely perennial herbs. **Leaves** imparipinnate, pulvinate; leaflets various; stipels setaceous or 0. **Flowers** in terminal racemes or leafy panicles; bracts linear, minute or 0. **Calyx** with narrowly campanulate tube, shortly toothed, sometimes tomentose. **Petals**: vexillum broadly obovate or orbicular, erect or spreading; wings oblong-oblique; keel oblong, suberect, with its petals usually imbricate or cohering along back. **Stamens** free or rarely subconnate at base; anthers versatile, sometimes with small, blunt, apical gland. **Ovary** shortly stalked, several- to many-ovuled, sometimes densely villous; style somewhat incurved; stigma small, terminal. **Pod** moniliform, terete or slightly compressed, fleshy, indehiscent or obscurely 2-valved, often beaked. **Seeds** obovoid or globose. $x = 7, 8, 9, 11, 13$ (polyploidy).

Species ± 50 cosmopolitan in warm regions; 1 in sthn Afr.: *Sophora inhambensis* Klotzsch (= *S. nitens* Benth.), KwaZulu-Natal. **S. japonica* L. and **S. secundiflora* Lag. are grown as street trees or garden ornamentals.

*Spartium L. 3674000

(Papilionoideae—Genisteae—Genistinae)

Linnaeus 708 (1753); Hutchinson: 354 (1964); Heywood: 101 (1968).

Unarmed shrubs, often with leafless branches. **Leaves** rare, 1-foliolate; stipules 0. **Flowers** showy, bright yellow, in terminal, many-flowered racemes; bracts and bracteoles minute, caducous. **Calyx** subspathaceously split at back; teeth 5, short, upper 2 free, lower 3 connate into a lip. **Petals**: vexillum large; wings obovate; keel incurved, acuminate, longer than wings, claw adnate to staminal tube. **Stamens** monadelphous; alternate anthers short and versatile, alternately longer and basifixed. **Ovary** sessile, many-ovuled; style incurved, glabrous; stigma oblong, decurrent on inside. **Pod** linear-oblong, glabrous, flat, dehiscent, 2-valved, subseptate between seeds inside. **Seeds** many, estrophiolate. $x = 6, 8, 9, 13$ (polyploidy).

Species 1: **Spartium junceum* L., Mediterranean region and SW Europe; now naturalised in Gauteng and the S Western and Eastern Cape Provinces.

Sphenostylis E.Mey. 3907000

(Papilionoideae—Phaseoleae—Phaseolinae)

Meyer: 148 (1836); Harvey: 239 (1862); Burtt Davy: 418 (1932); Dyer: t. 1010 (1947); Verdoorn: t. 1521 (1969); Verdcourt: 388 (1970b).

Shrublets or perennial herbs, prostrate, climbing or erect. **Leaves** pinnately 3-foliolate, stipulate. **Flowers** few, conspicuous, in congested heads on long peduncles, with or without bracts; bracteoles 2. **Calyx** glabrous, with campanulate tube; lobes 5, ovate, obtuse, shorter than tube. **Petals**: vexillum rounded, with 2 inflexed auricles, with margins sometimes reflexed, subsessile or with short, deeply channelled claw; wings eared, with linear, sometimes short, claw; keel incurved, ± concave-convex, obtuse, sometimes gibbous, subsessile or with short claw. **Stamens** diadelphous, with vexillary stamen sometimes adnate with others at base. **Ovary** sessile, linear, many-ovuled, surrounded by cupular disc at base; style scarcely thickened above, sometimes articulated on ovary, with flat, oblique, ciliated stigma. **Pod** linear, compressed, 2-valved, septate between seeds; valves convex. **Seeds** black, oblong, thick, minutely papillose. $x = 12$ (aneuploids).

Species 7 or 8, Africa and India; 2 in sthn Afr.: *Sphenostylis angustifolia* Sond. and *S. marginata* E.Mey. subsp. *marginata*, the four northern provinces, Swaziland, Free State and KwaZulu-Natal.

Stirtonanthus B.-E.van Wyk & A.L.Schutte 3621020

(Papilionoideae—Podalyrieae)

Van Wyk & Schutte: 67 (1995).

Stirtonia B.-E.van Wyk & A.L.Schutte: 319 (1994).

Single-stemmed or multi-stemmed shrubs or small trees. **Leaves** simple, flat, obovate to ± orbicular, petiolate, densely tomentose on both surfaces, coriaceous; stipules paired. **Flowers** 2–4(–6), decussate, in axillary, pedunculate inflorescences; bracts sheathing pedicel, sometimes clasping calyx, densely tomentose; bracteoles 0. **Calyx** with base intrusive; upper 2 lobes fused higher up; lateral lobes often coherent with upper lobes or carinal lobe. **Corolla** yellow, longer than calyx, glabrous; standard transversely elliptic, apex emarginate, claw thick, rigid; wing petals oblong to obovate, slightly longer than keel, tips imbricate; keel petals semicircular, rostrate, auriculate, apex obtuse. **Stamens** diadelphous, free almost to the base; anthers slightly dimorphic, 5 + 5, alternately dorsifixed and subbasifixed. **Ovary** 5- or more-ovuled; style slender, slightly upcurved, densely hairy at least on lower half. **Pod** coriaceous, linear to obliquely-oblong, compressed to somewhat inflated, 5–8-seeded, densely sericeous to tomentose. **Seeds** elliptic to obovate in side view, dark green to black or orange-brown to reddish brown.

Species 3, Western Cape: mainly in Montagu, Ladismith, Prince Albert and Oudtshoorn Districts.

Stylosanthes Sw. 3802000

(Papilionoideae—Aeschynomeneae—Stylosanthinae)
Swartz: 108 (1788); Harvey: 227 (1862); Torre: 213 (1966); Verdcourt: 492 (1973).

Erect or spreading perennial herbs or undershrubs, often viscid. **Leaves** pinnately 3-foliolate; leaflets conspicuously paler-veined. **Flowers** yellow, in dense, axillary or terminal heads, each in axil of a leafy bract, or flowers solitary, 2- or 3-bracteolate, or 2 together, one aborting, mainly unisexual, fertile ones often apetalous. **Calyx** with slender tube, 5-lobed; lobes membranous, 4 upper connate, lowest slender. **Petals** arising in throat of calyx tube; vexillum rounded or obovate, emarginate, sessile; wings shortly clawed; keel incurved, subrostrate. **Stamens** monadelphous, arising at mouth of calyx tube; anthers unequal, 5 longer and subbasifixed, 5 shorter and versatile. **Ovary** linear, subsessile, 2- or 3-ovuled; style filiform, articulating towards base; stigma small, terminal. **Pod** oblong, compressed, beaked, with hooked style-base, segmented. **Seeds** ovoid or irregularly oblong, compressed. $x = 10$ (polyploidy).

Species ± 25, in the tropics and subtropics of both hemispheres; 1 in sthn Afr.: *Stylosanthes fruticosa* (Retz.) Alston (= *S. mucronata* Willd.), Namibia, Botswana, the four northern provinces, Swaziland and KwaZulu-Natal.

Sutherlandia R.Br. ex W.T.Aiton 3754000

(Papilionoideae—Galegeae—Coluteinae)
Aiton: 327 (1812) name conserved; Harvey: 212 (1862); Phillips & Dyer: 69 (1934).

Shrublets or halfshrubs with herbaceous branches. **Leaves** imparipinnate, pubescent to albo-tomentose, stipulate. **Flowers** in 2–7-flowered racemes, often ornamental. **Calyx** with campanulate tube; lobes variable. **Petals**: vexillum shorter than keel, slightly narrowed to base; wings clawed, with ear usually shorter than claw; keel clawed, eared, with claws connate except at base. **Stamens** diadelphous; tube ± 3 times longer than free portions; anthers equal. **Ovary** stalked, many-ovuled; style curved, laterally bearded above, with small capitate stigma. **Pod** membranous, bladdery. **Seeds** many, black, flattened, with funicle. $x = 8$ (1 report).

Species 5; Africa, mainly sthn Afr., widespread throughout.

Swartzia Schreb. 3574000

(Papilionoideae—Swartzieae)
Schreber: 518 (1791) name conserved; Brenan: 219 (1967); Schreiber: 19 (1967b); Ross: 136 (1977).

Trees or sometimes shrubs, unarmed. **Leaves** alternate, imparipinnate; leaflets opposite or alternate, without pellucid dots; stipules mostly small. **Flowers** in lateral racemes or sometimes in panicles or fascicles; bracteoles minute or 0. **Calyx** globose or ellipsoid and entire before opening, becoming torn or lobed; disc 0. **Petals** usually 1, rarely with 2 more lateral ones, or entirely absent. **Stamens** more than 30, in several rows around gynophore, free or nearly so; anthers arising near base, dehiscing by longitudinal slits. **Ovary** stalked, several- to many-ovuled; stigma small. **Pod** stalked, coriaceous or woody, cylindric or rarely compressed, indehiscent or dehiscent into 2 valves. **Seeds** 1–several. $x = 8$ (1 report).

Species ± 127, mostly tropical America, 2 in Africa; 1 in sthn Afr.: *Swartzia madagascariensis* Desv., N Namibia and Botswana.

Tamarindus L. 3508000

(Caesalpinioideae—Amherstieae)
Linnaeus: 34 (1753); Brenan: 151 (1967); Ross: 37 (1977).

Unarmed evergreen trees. **Leaves** paripinnate; leaflets opposite, in 10–18(–21) pairs, almost sessile, asymmetric basally; stipules minute, caducous. **Flowers** in lax terminal and lateral racemes; bracteoles 2, completely enclosing young flower bud but soon falling off. **Sepals** 4, imbricate, membranous, calyx tube shortly elongate-turbinate. **Petals** unequal; upper 3 imbricate, ± equal in length; lower 2 minute, setiform, below staminal tube. **Stamens**: filaments united ± halfway into a pubescent tube terminating in 3 upcurved anther-bearing filaments alternating with 5 sterile teeth; filaments short; anthers oblong. **Ovary** ± pubescent, stalked, with stalk adnate to calyx tube; ovules many; style elongated, thickened, with subcapitate, truncate, terminal stigma. **Pod** oblong or linear, incurved, thick, subcompressed, indehiscent, pulpy, septate between seeds. **Seeds** ± compressed, with continuous-margined areole on each face. $x = 12$ (aneuploids).

Species 1: *Tamarindus indica* L., Asia and Africa; isolated specimens are recorded in North-West and N KwaZulu-Natal, indicating chance introductions or relics.

Tephrosia Pers. 3718000

(Papilionoideae—Tephrosieae)
Persoon: 328 (1807) name conserved; Harvey: 203 (1862); Forbes: 951 (1948b); Gillett: 111 (1958c); Brummitt: 219 (1968).

Annual or perennial herbs or undershrubs, rarely shrubs. **Leaves** imparipinnate or digitately (1)3–5-foliolate or pinnately 3-foliolate; leaflets entire, usually narrowed at base and widest above middle; stipules usually setaceous, sometimes broad and striate. **Flowers** in racemes, axillary, opposite leaves, or terminal, sometimes on long peduncles; bracts subulate, ovate, or spatulate. **Calyx** with campanulate tube, somewhat 2-lipped; often 2 upper lobes connate and lowest the longest. **Petals**: vexillum usually with short, broad claw, sometimes with 2 callosities above claw, ± velvety-pubescent on outside; wings obliquely oblong or obovate, slightly adnate to keel, sometimes eared, clawed; keel incurved. **Stamens** monadelphous or diadelphous; anthers uniform. **Ovary** sessile, usually linear, rarely subglobose, (1 or 2)several- to many-ovuled, usually hairy; style incurved or inflexed, often linear, compressed, often bearded, with terminal, capitate stigma. **Pod** linear or rarely ovate, compressed, 2-valved, sometimes septate within. **Seeds** oblong or subreniform, sometimes with a small strophiole; funicle short; aril almost absent, small or well developed. $x = 11$ (8, 12, 13) (polyploidy, B-chromosomes).

Species over 400, mainly in warm regions, abundant in Africa and Australia; ± 53 in sthn Afr., widespread.

Teramnus P.Browne 3866000

(Papilionoideae—Phaseoleae—Glycininae)
Browne: 290 (1756); Harvey: 234 (1862); Verdcourt: 533 (1971b).

Perennial herbs, climbing or trailing. **Leaves** pinnately 3-foliolate, stipulate. **Flowers** small, in axillary racemes, or flowers paired or fascicled in leaf axils; bracts small. **Calyx** sometimes densely hairy, with cylindric-campanulate tube, 4- or 5-lobed; 2 upper lobes somewhat fused. **Petals**: vexillum obovate or rounded, narrowed to base, glabrous or with few hairs near middle; wings clawed, adnate to keel; keel nearly straight, shorter than wings, clawed. **Stamens** monadelphous; alternate anthers small, abortive. **Ovary** sessile, linear,

many-ovuled, sometimes hairy; style short, thick, with capitate stigma. **Pod** linear, 2-valved, septate, tipped with persistent and hooked style. **Seeds** light brown, oblong, almost as thick as long. $x = 14$ (10, 11).

Species ± 8, fairly cosmopolitan in warm regions; 1 in sthn Afr.: *Teramnus labialis* (L.f.) Spreng. subsp. *labialis*, the four northern provinces, Swaziland, KwaZulu-Natal and Eastern Cape near Komga.

Trifolium L. 3690000

(Papilionoideae—Trifolieae)

Linnaeus: 764 (1753); Harvey: 158 (1862); Gillett: 1016 (1971a); Zohary & Heller: 53 (1984).

Annual or perennial herbs, with erect, ascending or procumbent stems. **Leaves** digitately 3(5–9)-foliolate; leaflets dentate or entire; stipules adnate to petioles, entire or sometimes dentate. **Flowers** white, yellow, purple, pink, flesh-coloured, lilac, violet or 2-coloured, pedicellate or sessile, in spikes, heads, or umbels, rarely solitary; bracts small or 0. **Calyx** often with campanulate tube, 5–10(–36)-nerved; lobes variable. **Corolla** persistent; petals all, or lower 4, ± adnate to staminal tube; vexillum sessile; wings oblong, eared, clawed; keel oblong or planoconvex, clawed. **Stamens** diadelphous; vexillary stamen free or partly connate with rest; filaments sometimes all, or alternate ones, broadened; anthers uniform. **Ovary** sessile or subsessile, 1–12-ovuled; style straight and incurved above, with capitate stigma. **Pod** ovate or oblong, compressed or subterete, indehiscent within calyx or opening by sutures. **Seeds** 1 or 2(4), globular to ovoid and oblong, sometimes reniform to lenticular. $x = 7, 8$ (5, 6, 9) (polyploidy, B-chromosomes).

Species ± 250, cosmopolitan in temperate and subtropical regions of the northern and southern hemispheres; 19 in sthn Afr., including some introduced and widespread ones, mainly near cultivation.

Trigonella L. 3687000

(Papilionoideae—Trifolieae)

Linnaeus: 776 (1753); Harvey: 161 (1862); Ivimey-Cook: 150 (1968).

Herbs, often strongly scented. **Leaves** pinnately 3-foliolate; stipules adnate to petioles. **Flowers** solitary and sessile, or peduncled in leaf axils, or in heads, or subumbels or short, dense racemes; bracts minute. **Calyx** with campanulate tube; lobes ovate, acuminate, ± as long as tube. **Petals**: vexillum sessile or clawed; wings oblong, eared, clawed; keel shorter than wings, planoconvex, clawed. **Stamens** diadelphous, with vexillary stamen free or connate with others to middle; anthers uniform. **Ovary** sessile or shortly stalked, few- to many-ovuled; style with terminal stigma. **Pod** a straight or rarely falcate legume, usually dehiscent. **Seeds** usually many. $x = 8$ (6, 7, 11) (polyploidy, B-chromosomes).

Species ± 80, Mediterranean region, central Europe, Africa, Asia to Australia; 2 in sthn Afr., scattered, mainly central, but not extending much into Western Cape.

Tylosema (Schweinf.) Torre & Hillc. 3528030

(Caesalpinioideae—Cercideae)

Torre & Hillcoat: 38 (1955); Torre & Hillcoat: 194 (1956); Brenan: 213 (1967); Schreiber: 19 (1967b); Coetzer & Ross: 61 (1977).

Shrubs with trailing or climbing stems, herbaceous or woody towards base, arising from a large, underground tuber; tendrils usually present, forked, axillary. **Leaves** simple, bilobed at apex or sometimes divided almost to cordate base; lobes oval to obovate or reniform; stipules oblong to squarish, appressed to stem, persistent. **Inflorescence** a lateral short to elongate raceme. **Flowers** bisexual, irregular, medium to rather small, yellow. **Calyx** arising from short receptacle; sepals 5, the two upper usually completely or partly fused, others free. **Petals** 5; upper one bicallose at base and smaller than others. **Stamens** 2 fertile, (7)8 staminodial, unequal, some ± flattened. **Ovary** long-stalked; style elongate, with small stigma. **Pod** woody, dehiscent or indehiscent (1)2-seeded. **Seeds** large, with short U-shaped mark extending from hilum.

Species ± 4, Africa; 2 in sthn Afr., Namibia, the four northern provinces, Swaziland, N KwaZulu-Natal and Northern Cape.

*Ulex L. 3681000

(Papilionoideae—Genisteae—Genistinae)

Linnaeus: 741 (1753); Hutchinson: 352 (1964); Guinea & Webb: 102 (1968).

Shrubs; branchlets very spiny. **Leaves** usually alternate, 3-foliolate on seedlings, but reduced to scale-like or narrow, usually spine-like phyllodes on mature plants; stipules 0. **Flowers** yellow, axillary, solitary or in small clusters, sometimes aggregated into racemes or umbel-like inflorescences; bracteoles 2, immediately below the flower. **Calyx** ± yellow, persistent, divided to base into 2 lips; upper lip 2-toothed, lower lip 3-toothed. **Petals**: vexillum ovate; wings and keel obtuse. **Stamens** monadelphous, connate into a closed tube; anthers alternate, shorter and versatile, longer and basifixed. **Ovary** sessile, many-ovuled; style slightly incurved with terminal, capitate stigma. **Pod** ovate, oblong or shortly linear, compressed or turgid, continuous, 2-valved. **Seeds** 1–6, strophiolate. $x = 8$ (high polyploidy).

**Ulex europaeus* L., Gorse, occurs as an escape in forest areas of the Drakensberg between 2000–2300 m in KwaZulu-Natal and occasionally in similar areas of the Eastern Cape.

Umtiza Sim 3506010

(Caesalpinioideae—Detarieae)

Sim: 205 (1907); Hutchinson: 236 (1964); Germishuizen: t. 1939 (1987).

Evergreen trees or shrubs armed with stout spines which are often branched and bear leaves and inflorescences. **Leaves** paripinnate; leaflets in (3)5–9(12) pairs, subopposite or irregularly alternate, sometime a lateral leaflet appearing terminal; stipules 0. **Flowers** bisexual, irregular, small, white, in a short panicle, usually terminal on lateral shoots. **Calyx** campanulate-tubular, with 5 short, imbricate lobes. **Petals** 5, arising in mouth of calyx tube, free, slightly imbricate. **Stamens** 10, arising with petals; anthers reniform. **Ovary** sessile, 2-ovuled, pubescent; style terete, with truncate-capitate stigma. **Pod** 1-seeded, compressed, elongate, firmly membranous, dehiscent. **Seed** ovoid, somewhat compressed.

Species 1: *Umtiza listeriana* Sim, forests of East London, Kentani and King William's Town Districts of the Eastern Cape.

*Vicia L. 3852000

(Papilionoideae—Vicieae)

Linnaeus: 734 (1753); Harvey: 233 (1862); Hutchinson: 452 (1964); Verdcourt: 1067 (1971c).

Annual or perennial herbs, usually climbing by means of tendrils. **Leaves** mostly paripinnate; petioles of all or upper leaves ending in a simple or branched tendril or a recurved bristle; leaflets entire or toothed; stipules semisagittate, often fimbriate or toothed. **Flowers** often blue, purple or yellow, 1 or few in leaf axils or racemose; bracts usually minute and caducous. **Calyx** tubular, often oblique at base; lobes subequal or 2 upper the shortest. **Petals**: vexillum obovate or oblong, clawed; wings obliquely oblong, adherent to middle of keel; keel

shorter than wings. **Stamens**: vexillary stamen free or ± connate with others. **Ovary** subsessile or shortly stalked; ovules (2–)many; style compressed dorsally, usually pubescent at apex. **Pod** oblong to linear, compressed. **Seeds** globose or rarely compressed. x = 5, 6, 7, 11 (polyploidy, B-chromosomes).

Several introduced species have become naturalised in sthn Afr. near cultivated land.

Vigna Savi 3905000

(Papilionoideae—Phaseoleae—Phaseolinae)
Savi: 113 (1824); Harvey: 239 (1862);Verdcourt: 617 (1971b); Maréchal *et al.*: 164 (1978).

Annual or perennial herbs, climbing or prostrate, rarely short and erect. **Leaves** (1)3-foliolate, stipulate and stipellate; stipules varying from ovate to lanceolate or almost linear to filiform, base varying from spurred below point of attachment to cordate and median attachment with free lateral auricles. **Flowers** shading from white flushed with mauve to cream flushed with green or yellow; or shading from blue, lilac, mauve, purple to magenta, racemose, 1 or 2 together or fasciculate at top of axillary peduncles; bracts small, caducous. **Calyx** with campanulate tube; 2 upper lobes or teeth separate or connate. **Petals**: vexillum reflexed, from reniform to oblate, with basal, inflexed appendages and channelled claw; wings falcate-obovate, eared, clawed; keel incurved, sometimes into a somewhat spiral beak, clawed. **Stamens** diadelphous or monadelphous; filaments often dilated above; anthers uniform. **Ovary** sometimes with basal disc, sessile, with several to many ovules; style often thickened above, bearded along inner margin, with oblique or introrsely lateral stigma. **Pod** subterete, straight or slightly incurved, 2-valved, dehiscing spirally (in wild species). **Seeds** reniform or subquadrate with lateral hilum. x = 10, 11 (9, 12, 17) (polyploidy).

Species ± 160, cosmopolitan in tropical regions of both hemispheres, with more than 50 of these occurring in tropical Africa; ± 18 in sthn Afr., widespread, but absent from the Western Cape.

Virgilia Poir. 3608000

(Papilionoideae—Podalyrieae)
Poiret: 677 (1808) name conserved; Harvey: 266 (1862); Salter: 58 (1939b); Van Wyk: 348 (1986).

Small trees with crown narrow or spreading. **Leaves** very variable, imparipinnate; leaflets with (2–)6–12(–23) pairs of pinnae, subsessile, linear, linear-lanceolate, lanceolate, elliptic or narrowly ovate, with a short, apical mucro; stipules linear, acuminate. **Flowers** pink to rose-violet, violet-purple or rarely white, in axillary and subterminal racemes; bracts small, caducous. **Calyx** 2-lipped, tomentose; tube basin-shaped, somewhat compressed laterally, introrse at base; upper lip 2-toothed; lower lip 3-toothed, both longer than tube. **Petals**: vexillum suborbicular or obovate, strongly reflexed; wings falcate, clawed; keel somewhat shorter than wings, incurved, beaked, with 2 petals clawed. **Stamens** 10, free; filaments linear, narrowing upwards, villous; anthers small, versatile. **Ovary** shortly stalked, 5–8-ovuled, densely villous; style curved, narrowing into small, terminal stigma with a few hairs. **Pod** dehiscent, sometimes only along upper suture, coriaceous or sometimes woody, linear to linear-oblong, 2-valved. **Seeds** elliptic in outline, yellow-brown, dark brown or black. x = 6 or 9 (1 report, polyploidy).

Species 2, limited to moist sites along the Cape coastal region of South Africa, from the Cape Peninsula (Western Cape) to Port Elizabeth (Eastern Cape).

Walpersia Harv. 3647000

Harvey: 26 (1826); Dahlgren: 97 (1965b); Polhill: 392 (1981b).

Walpersia is regarded as a synonym of *Phyllota* DC., a genus known only from Australia. Dahlgren (1965b) is of the opinion that a label with a Cape Peninsula locality was probably mistakenly placed with the specimen on which *Walpersia* was based.

Wiborgia Thunb. 3661000

(Papilionoideae—Crotalarieae)
Thunberg: 137 (1800b) name conserved; Harvey: 90 (1862); Dahlgren: 9 (1975).

Shrubs, rigid, sometimes spinescent. **Leaves** petiolate, digitately 3-foliolate; stipules small or 0. **Flowers** few to many in terminal, often unilateral racemes; bracteoles usually very small. **Calyx** with campanulate tube, somewhat 2-lipped; lobes shorter than tube. **Petals**: vexillum standing apart, ovate to obovate, reflexed, with linear or linear-spatulate claw; wings usually shorter than vexillum and keel, broadest near base, clawed; keel incurved, longer than vexillum, long-clawed. **Stamens** monadelphous; staminal tube split to base; anthers unequal. **Ovary** stalked, elliptic, few-ovuled, glabrous; stigma minutely capitate. **Pod** stipitate, indehiscent, oblong, oblong-elliptic or orbicular in lateral view, winged on upper suture, sharp and thin along the lower; valves sometimes ridged. **Seeds** 1–3, reniform, on filiform funicles. x = 9.

Species ± 10, sthn Afr., from Namaqualand (Northern Cape) to George (Western Cape).

Xanthocercis Baill. 3847000

(Papilionoideae—Sophoreae)
Baillon: 293 (1870); Harms: 162 (1902); Hutchinson: 327 (1964).

Pseudocadia Harms: 162 (1902); Phillips: 399 (1951).

Very tall trees with rounded crowns. **Leaves** pulvinate, imparipinnate; leaflets 3–4-jugate, unpleasant-smelling when bruised; stipules small. **Flowers** white, cream or yellow, in axillary racemes with small, caducous bracts. **Calyx** with campanulate tube, shortly lobed. **Petals** 5, arising at base of calyx tube, unequal, with linear claw, imbricate; vexillum small, gradually broadened from claw, hairy. **Stamens** 10, arising with petals, connate at base, with vexillary stamen free; anthers oblong. **Disc** annular. **Ovary** stipitate, linear, with few to several ovules; style short, with lateral stigma. **Fruit** drupaceous, ellipsoid, indehiscent. **Seeds** solitary, with black testa.

Species 2, Africa and Madagascar; 1 in sthn Afr.: *Xanthocercis zambesiaca* (Baker) Dumaz-le-Grand (= *Pseudocadia zambesiaca* (Baker) Harms), Northern Province.

Xerocladia Harv. 3453000

(Mimosoideae—Mimoseae)
Harvey: 278 (1862); Ross: 130 (1975); Schreiber: 19 (1967b).

Shrublets with many rigid, somewhat zigzag branches, with recurved, spinescent stipules. **Leaves** few, small, bipinnate, with pinnae 1–2-jugate; leaflets. small, few-jugate. **Flowers** bisexual, sessile, in axillary, shortly pedunculate heads. **Calyx** campanulate, with 5 lobes longer than tube. **Petals** 5, valvate, linear, free almost to base. **Stamens** 10, free, 5 opposite petals short, 5 alternating with petals longer but scarcely exceeding petals; anthers with minute, terminal, deciduous gland apically. **Ovary** subsessile, 1(2)-ovuled, villous; style filiform, somewhat thickened above, with truncate stigma. **Pod** broadly falcate-ovate or semiorbicular, plano-compressed, 1-seeded, with lower suture arched and winged. **Seed** compressed-ovoid, smooth.

Species 1, sthn Afr.: *Xerocladia viridiramis* (Burch.) Taub. (= *X. zeyheri* Harv.), Namibia and Namaqualand (Northern Cape).

Xeroderris Roberty 3838010

(Papilionoideae—Tephrosieae)

Roberty: 353 (1954); Mendonça & Sousa: 273 (1968); Polhill: 91 (1971b).

Ostryoderris Dunn: 363 (1911).

Deciduous trees; slash producing blood-red resinous exudate. **Leaves** imparipinnate; stipules present, caducous; stipels almost always 0. **Flowers** white, in lateral, spreading panicles, a number together from young shoots which grow out into leafy branches; bracts and bracteoles small, caducous. **Calyx** campanulate, shortly 5-lobed, the upper 2 obscure. **Petals**: vexillum shortly clawed, scarcely callused, suborbicular to oblate; wings oblong-obovate; keel with elliptic-falcate blades, lightly coherent along lower side. **Stamens** diadelphous, with vexillary stamens free; anthers dorsifixed. **Ovary** sessile, few-ovuled; style curved, attenuate, with a small, incurved stigma. **Pod** indehiscent, compressed, margined with a wing on each side; valves coherent between seeds. **Seeds** oblong-reniform. $x = 12$ (1 report).

Species 1, in the savanna regions of tropical Africa: *Xeroderris stuhlmannii* (Taub.) Mendonça & E.P.Sousa (= *Ostryoderris stuhlmannii* Taub.) Harms, Northern Province.

Xiphotheca Eckl. & Zeyh. 3643010

(Papilionoideae—Liparieae)

Ecklon & Zeyher: 166 (1836); Schutte & Van Wyk: 43 (1993); Schutte: 90 (1997).

Priestleya DC. sect. *Anisotheia* DC.: 91 (1825b).

Woody shrubs or shrublets. **Leaves** alternate, rarely opposite, simple, narrowly elliptic to almost circular, mostly flat, sometimes with recurved margins; petiole very short; stipules inconspicuous, often lacking. **Inflorescence** axillary, 2-flowered, pedunculate and with the two flowers opposite, aggregated into synflorescences of up to 16 flowers; bracts linear to oblanceolate; bracteoles minute, often lacking. **Calyx** usually narrowed to the base; upper 2 lobes fused higher up than lower 3 lobes; carinal lobe sometimes longer than the upper 4. **Corolla** yellow, longer than calyx, glabrous; vexillum suborbicular to elliptic; wings oblong, longer than keel, tips imbricate; keel widely obovate, with distinct pockets, apex obtuse. **Stamens** diadelphous, vexillary filament free; anthers alternately dorsifixed and subbasifixed. **Ovary** 4- or more-ovuled; style slender, slightly upcurved, glabrous. **Pod** somewhat compressed, usually linear, sometimes obliquely oblong, coriaceous, densely sericeous to tomentose. **Seeds** 4 to many, oblong-reniform.

Species ± 9, southern Cape region, endemic to the fynbos, as far eastward as the Outeniqua Mountains.

Xylia Benth. 3462000

(Mimosoideae—Mimoseae)

Bentham: 417 (1842); Brenan: 359 (1957); Brenan: 29 (1959); Brenan & Brummitt: 33 (1970); Ross: 136 (1975).

Trees tall, unarmed, with hard wood. **Leaves** bipinnate, with 1 pair of large pinnae or with more pairs and smaller pinnae; petiolar gland elevated or obscure; stipules small, linear, deciduous. **Flowers** mostly bisexual, small, sessile, in capitate clusters on solitary, axillary peduncles, or subfasciculate, or racemose at the top of branches, pale green. **Calyx** tubular-campanulate, 5-dentate. **Petals** 5, slightly coherent at base, ± pubescent or puberulous outside. **Stamens** 10, free, exserted; anthers ovate, with many pollen grains, glandular at apex. **Ovary** sessile, many-ovuled, pubescent; style filiform, with small, terminal stigma. **Pod** broadly falcate, compressed, thick and woody, 2-valved, with valves elastically recurved from apex, septate within between seeds. **Seeds** transverse, obovate, compressed, with short, fleshy funicle. $x = 12$.

Species ± 12, tropical Asia to Africa; 1 in sthn Afr.: *Xylia torreana* Brenan, rare in the Pafuri region of the Kruger National Park (Northern Province).

Zornia J.F.Gmel. 3804000

(Papilionoideae—Aeschynomeneae—Aeschynomeninae)

Gmelin: 1076, 1096 (1791); Harvey: 225 (1862); Mohlenbrock: 1 (1961); Verdcourt: 497 (1973).

Erect or prostrate herbs, mainly perennial. **Leaves** digitately 2–4-foliolate; leaflets often pellucid-dotted; stipules subfoliaceous. **Flowers** yellow or orange-yellow, solitary or in interrupted spikes; spikes pedunculate, axillary or terminal; bracts enclosing flowers. **Calyx** membranous, 2 upper lobes connate, 2 lateral small, lowest subequal to upper lip. **Petals**: vexillum clawed; wings clawed; keel incurved, subrostrate, clawed. **Stamens** monadelphous, united into a column below, which at maturity is circumscissile and upper part is shed with petals, lower tubular part remaining to protect ovary; anthers unequal, 5 larger subbasifixed, 5 smaller versatile. **Ovary** sessile; several- to many-ovuled; style filiform, with small, terminal stigma. **Pod** sessile, compressed, with upper suture nearly straight, lower deeply sinuate, 2–15-jointed, breaking into smooth or spiny, indehiscent segments. **Seeds** ovoid, mostly black or dark brown, without appendages. $x = 10, 11$.

Species ± 80, mainly Brazil; 4 in sthn Afr., widespread from northern borders to the Northern and Eastern Cape.

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*Fagaceae

(Hamamelidae—Fagales)

Compiled by M. Jordaan

Deciduous or evergreen, monoecious, trees or shrubs; buds with imbricate scales. **Leaves** alternate, simple, thin or leathery, entire, dentate, sinuate or pinnately lobed, rarely entire; stipules deciduous and inconspicuous. **Inflorescences** unisexual, in axils of leaves or bud scales, usually clustered at base of new growth; male inflorescences lax, solitary or 1–3 together in pendulous spikes or catkins; female inflorescences solitary, in erect, stiff dichasia, 1–5-flowered, with terminal cupule and sometimes 1–many sessile, lateral cupules. **Male flowers**: perianth tube campanulate; lobes 3–6, subtended by small bracteoles; stamens (2–)6(–12), surrounding tuft of silky hairs (apparently a reduced pistillode). **Female flowers** with smaller calyx, surrounded by an involucre of many imbricate or annular scales; ovary inferior, 3-locular; placentation axile; ovules 2 per locule, anatropous, crassinucellar, bitegmic; styles usually 3, short, recurved; stigmas broad, lining inner faces of styles. **Fruit** a nut (acorn) arising on or partly enclosed

by a cup-shaped or saucer-shaped cupule, involucral scales hardened into teeth or tubercles or annular lamellae. **Seed** 1, without endosperm; embryo straight, as long as seed, cotyledons plano-convex. $x = 12$ (aneuploids, polyploidy).

Genera 9; species 620–800; one of the most important families of woody plants of the temperate and tropical regions, mostly of the northern hemisphere, in SE Asia crossing the equator; no native representatives in tropical South America or in tropical and sthn Afr.; sthn Afr.: genus 1, species at least 5, all exotic.

Dumortier: 11 (1829), as Fagineae; Prantl: 47 (1889); Kubitzki: 301 (1993).

*Quercus L. 1893000

Linnaeus: 994 (1753); Linnaeus: 431 (1754); Jussieu: 410 (1789); Willdenow: 423 (1805); Prantl: 47 (1889); Camus (1936–1954); Schwarz: 61 (1964); Friis: 265 (1989); Kubitzki: 308 (1993); Nixon: 445 (1997).

Description as for family.

Species ± 350–450; in the northern temperate and subtropical regions with extensions into the tropics in W Malesia and NW South America. Several species of **Quercus* (Oaks), have been fairly extensively cultivated and at least 5 occur as escapes, notably **Quercus robur* L. in the Western Cape.

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Flacourtiaceae

(Dilleniidae—Violales)

Compiled by C.L. Bredenkamp

Trees or shrubs, armed or unarmed, monoecious or dioecious, occasionally polygamous. **Leaves** alternate, rarely opposite or whorled, simple, entire or toothed, teeth often glandular; stipules present or 0. **Inflorescence** axillary or terminal, racemose, corymbose or paniculate, or flowers fasciculate or solitary. **Flowers** regular, bisexual or unisexual. **Sepals** 3–6 or more, free or connate below into a calyx tube, contorted or imbricate, rarely valvate, often persistent or accrescent. **Petals** as many as sepals, or more, or 0, usually small and inconspicuous, free, contorted or imbricate, with or without a scale on inner face. **Disc** extrastaminal or with free glands between stamens or of staminode-like scales inserted at base of petals, often adnate to receptacle. **Stamens** 5–many, free or rarely connate, sometimes alternating with staminodes; anthers 2-thecous, dehiscing by longitudinal slits, rarely by apical pores. **Ovary** superior or more rarely semi-inferior, 1-locular with 1–many ovules on 2–8 parietal placentas, rarely ovules axile; styles 1–10, free or connate. **Fruit** a capsule or berry, 1–many-seeded. **Seeds** usually small, sometimes arillate; testa woody, leathery or chartaceous; embryo straight; cotyledons usually broad; endosperm fleshy, copious, rarely thin or 0.

Genera 89, species ± 1250, mainly tropical and subtropical, Old and New World; sthn Afr.: genera 13, species 25.

Harvey: 65 (1860) under Bixaceae, Endl.; Wild: 261 (1960); Killick: 53 (1976).

Key to genera

1a Leaves opposite ..... **Pseudoscolopia**
1b Leaves alternate:
2a Petals with a fleshy gland on the inner face or staminodes petaloid with fleshy glands:
3a Stamens numerous; petals spirally arranged ..... **Rawsonia**
3b Stamens 10–12; petals whorled ..... **Kiggelaria**
2b Petals or petaloid staminodes without fleshy glands; petals sometimes 0:
4a Petals present:
5a Petals more than sepals:
6a Branches spiny; fruit globose, indehiscent ..... **Oncoba**
6b Branches without spines; fruit ovoid, beaked, dehiscing into 4–8 valves ..... **Xylotheca**
5b Petals as many as sepals:
7a Stamens numerous, not collected in bundles opposite petals; fruit a berry ..... **Scolopia**
7b Stamens equal in number to petals or in bundles opposite petals; fruit usually a capsule:
8a Leaves with 5–9 nerves from base; flowers unisexual; seeds with a red aril ..... **Trimeria**
8b Leaves penninerved; flowers bisexual; seeds without an aril:
9a Style simple with a capitate or minutely bilobed stigma; flowers in pedunculate cymes; stipules deltoid… ..... **Gerrardina**
9b Styles 2–6 or 2–6-cleft; flowers in racemes or panicles; stipules 0 or large and orbicular or reniform.. **Homalium**
4b Petals 0:
10a Leaves with linear or circular pellucid glands ..... **Casearia**
10b Leaves without pellucid glands:

11a Stamens in bundles of 3–10 alternating with disc glands ..... **Trimeria**
11b Stamens not in bundles:
12a Flowers bisexual; style very short; stigma peltate; leaves narrowly elliptic to oblanceolate ..... **Aphloia**
12b Flowers unisexual or more rarely bisexual; styles 2–8; leaves elliptic to obovate or orbicular:
13a Stamens surrounded by a ring of disc glands; ovary incompletely 4–8-locular with 2 ovules per locule, one above the other ..... **Flacourtia**
13b Stamens intermingled with disc glands and alternating with them; ovules 1–6 per placenta..... **Dovyalis**

Aphloia (DC.) Benn. 5326000

Bennett: 192 (1840); Wild: 279 (1960); Killick: 80 (1976).

Trees or shrubs. **Leaves** alternate, narrowly elliptic or oblanceolate, serrated or sometimes incised, petiolate; stipules minute, caducous. **Flowers** bisexual, axillary, solitary, in few-flowered fascicles or racemes. **Calyx** 4–6-parted; sepals somewhat leathery, orbicular, concave, imbricate. **Petals** 0. **Disc** flat. **Stamens** many, arising outside or towards margin of disc; filaments free, terete, longer than sepals; anthers short, without appendages. **Ovary** superior, 1-locular, with few to several ovules on a single, parietal placenta; style short, stigma peltate. **Fruit** a fleshy berry with ± 6 seeds. **Seeds** obovoid or globose; testa incurved, crustaceous; endosperm thin; embryo incurved; cotyledons ovate. $x = 10$.

Species ± 6, Tanzania to KwaZulu-Natal also Madagascar and Mascarenes; 1 in sthn Afr.: *Aphloia theiformis* (Vahl) Benn., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal.

Casearia Jacq. 5343000

Jacquin: 4, 21 (1760); Wild: 293 (1960); Killick: 91 (1976); Sleumer: 280 (1980).

Trees or shrubs. **Leaves** alternate, petiolate, entire, serrate or with subspinose teeth; stipules small. **Inflorescence** an umbel or flowers fascicled or rarely solitary. **Flowers** bisexual. **Calyx tube** short or subelongated or 0; sepals 4–6, suborbicular, concave, imbricate. **Petals** 0. **Stamens** 6–15, rarely 20–40, free or connate, hypogynous or arising from calyx tube or at base of calyx; filaments linear, connective of anthers sometimes penicillate at apex; staminodes alternating with stamens, sometimes oblong and hairy at apex. **Ovary** superior, 1-locular with few to many ovules on 3 or 4 parietal placentas; style short; stigma capitate or peltate or stigmas 3. **Fruit** a subfleshy or dry capsule, opening by 3 or 4 valves, few- to many-seeded. **Seeds** sometimes angled, with a fleshy aril; testa chartaceous; embryo straight; cotyledons flat, elliptic or suborbicular; endosperm present. $x = 7$ (11) (polyploidy).

Species ± 160, cosmopolitan in tropics; 1 in sthn Afr.: *Casearia gladiiformis* Mast., KwaZulu-Natal, Eastern Cape near East London; in forest, chiefly along the coast.

Dovyalis E.Mey. ex Arn. 5328000

Arnott: 251 (1841); Harvey: 69 (1860); Sleumer: 64 (1972a); Langenegger: 84 (1976).

Aberia Hochst.: 2 (1844); Sonder: 9 (1850); Harvey: 70 (1860).

Trees or shrubs, evergreen or deciduous, dioecious or rarely polygamous, often armed with spines; branches lenticellate. **Leaves** alternate or sometimes fascicled, petiolate; blade 3–5-veined at or near base, margins entire, crenate or serrate; stipules 0. **Male flowers** pedicellate, in fascicles of 2–10, or 5–10 flowers in groups of 3; pedicels surrounded at base by small hairy scales; calyx 2–6-lobed; corolla 0; stamens 10–many; filaments surrounded at base by sparsely to densely hairy nectaries which form a honeycomb structure; anthers bilocular, dehiscing by means of longitudinal slits. **Female flowers** pedicellate, axillary, solitary or in fascicles of 2 or 3; pedicels surrounded at base by small hairy scale-like bracts; calyx deeply 3–7-lobed; lobes sometimes revolute and sometimes fringed with stipitate glands; corolla 0; disc annular, lobed, glutinous, hairy, sparsely hairy or glabrous; ovary unilocular or sometimes incompletely 2- or 3-locular; placentas 2–7, parietal, each placenta with 1 or 2 ovules; styles channelled, as many as placentas. **Fruit** a subglobose to oblong berry, minutely papillose, glabrous or hairy. **Seeds** embedded in fleshy pulp, elliptic to broadly elliptic, glabrous to densely woolly; testa leathery; embryo straight; cotyledons flat, elliptic, sometimes thin and pinnately veined; endosperm present. $x = 10$.

Species ± 20, widespread in Africa and extending to Sri Lanka and New Guinea; 6 recognised in sthn Afr.: Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Flacourtia L'Hér. 5327000

L'Héritier de Brutelle: 59 (1786); Wild: 285 (1960); Killick: 82 (1976).

Trees or shrubs, often spiny, usually dioecious. **Leaves** alternate, petiolate, mostly crenate. **Flowers** unisexual, rarely bisexual, in short axillary racemes or solitary. **Calyx** 4–7-partite or sepals free and imbricate. **Petals** 0. **Male flowers**: stamens many; filaments terete; anthers small, elliptic or somewhat quadrate, sometimes subdidymous. **Female flowers**: stamens 0 or few; ovary surrounded by annular or interrupted disc, usually 4–8-locular with 2 superposed ovules in each locule; styles 4–8, short, thick, ± radiating, persistent; stigma retuse or marginate. **Fruit** a berry, 5–16-locular. **Seeds** obovoid or subcompressed; testa bony, rough; embryo straight; cotyledons flat, ovate; endosperm present. $x = 11$ (9, 10) (polyploidy).

Species ± 15, SE Asia, Malaysia, Polynesia, Madagascar, tropical and sthn Afr.; 1 in sthn Afr.: *Flacourtia indica* (Burm.f.) Merr., in Namibia, Botswana, Northern Province, North-West, Mpumalanga, KwaZulu-Natal and Eastern Cape.

Gerrardina Oliv. 5312000

Oliver: 60, t. 1075 (1870); Wild: 287 (1960); Killick: 72 (1976).

Scrambling or erect shrubs or trees. **Leaves** alternate, petiolate; blades elliptic or ovate, sometimes acuminate, serrulate to serrate or crenate-serrate; stipules present. **Inflorescence** a few-flowered axillary cyme on a long peduncle. **Flowers** bisexual. **Calyx tube** campanulate; lobes 5, imbricate, unequal, 2 outer shorter. **Petals** 5, shorter than calyx and alternating with calyx lobes, inserted on margin of disc, deciduous. **Disc** cup-shaped, lining calyx tube. **Stamens** 5, opposite petals, inserted on margin of disc. **Ovary** superior, 1-locular, with 4 pendulous ovules. **Fruit** a dry capsule. **Seeds** 1–4, ellipsoid or obovoid; testa smooth or reticulate.

Species 2, Africa; 1 occurring in Zimbabwe, Malawi, Mozambique and Tanzania; 1 in sthn Afr.: *Gerrardina foliosa* Oliv., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape (Pondoland).

Homalium Jacq. 5313000

Jacquin 5, 24 (1760); Harvey: 72 (1860); Wild: 287 (1960); Sleumer: 239 (1973); Killick: 74 (1976).

Blackwellia Comm.: 343 (1789); Harvey: 72 (1860).

Trees or shrubs. **Leaves** alternate, petiolate; blade ovate, elliptic, suborbicular or oblong, sometimes large; stipules 0, minute or large. **Inflorescence** an axillary or terminal raceme or panicle. **Flowers** bisexual. **Calyx**: tube turbinate; sepals 7–9, usually narrow, persistent. **Petals** 7–9, inserted in mouth of calyx tube, alternating with and similar to sepals but broader, persistent. **Stamens** solitary or in fascicles of 2 or 3 or more, alternating with glands which are adnate to base of sepals, terete; anthers small, didymous. **Ovary** semisuperior, 1-locular with 2–5 parietal placentas; styles 2–5; stigmas simple or capitate. **Fruit** a semisuperior, leathery capsule, 1- or few-seeded, opening at apex by 2–5 valves. **Seeds** 1 or few. $x = 9, 10, 11$ (1 report each).

Species ± 180, cosmopolitan, tropical and subtropical; 3 in sthn Afr., Namibia, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape near East London.

Kiggelaria L. 5296000

Linnaeus: 1037 (1753); Harvey: 71 (1860); Wild: 265 (1960); Killick: 60 (1976).

Unarmed, dioecious shrubs or small trees. **Leaves** alternate, petiolate, usually elliptic or ovoid, variously toothed, sometimes discolorous; stipules 0. **Flowers** unisexual. **Male flowers** in axillary cymes, on longish pedicels. **Female flowers** solitary on long pedicels. **Sepals** 5-parted, segments narrowly elliptic, valvate, deciduous, puberulous. **Petals** 5, often very similar to sepals, elliptic, imbricate, each with a fleshy gland adnate at base to petals and free above, puberulous. **Stamens** 8–10, free; filaments short; anthers 2-thecous, opening by terminal pores. **Ovary** sessile, ellipsoid, 1 or 2(–5) parietal placentas, densely pubescent; style short and thick, divided into 5 branches. **Fruit** a globose, woody, several-seeded capsule; valves 2–5, pubescent, sometimes tuberculate. **Seeds** subglobose; testa somewhat woody; embryo straight; cotyledons flat, suborbicular; endosperm fleshy.

Species probably only 1, tropical to sthn Afr.: *Kiggelaria africana* L., in all provinces of sthn Afr. and Swaziland and Lesotho; in forest, open forest, kloofs, along streams, scrub and even mountains of the Karoo. Sometimes placed in Kiggelariaceae.

Oncoba Forssk. 5284000

Forsskål: CXIII, 103 (1775); Harvey: 66 (1860); Wild: 275 (1960); Killick: 56 (1976); Hul & Breteler: 255 (1997).

Trees or shrubs, unarmed or with axillary spines; branches glabrous. **Leaves** alternate, simple, petiolate, elliptic or ovate, margin serrate; stipules present. **Flowers** bisexual, terminal or axillary, often on short side-shoots, usually large and showy. **Sepals** 3 or 4, free or united at base, imbricate. **Petals** 5–10 or more, exceeding the sepals, whorled. **Stamens** numerous, free; anthers linear. **Ovary** superior, 1-locular with 2–10 multiovulate parietal placentas; style simple. **Fruit** large, globose, with woody pericarp, smooth, indehiscent, many-seeded. **Seeds** with a leathery testa; embryo with leafy cotyledons. $x = 11$ (10).

Species 4, Arabian Peninsula, tropical Africa; 1 in sthn Afr.: *Oncoba spinosa* Forssk., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Genus *Xylotheca* Hochst. regarded as synonymous to *Oncoba* Forssk. by Hul & Bretelcr (1997).

Pseudoscolopia Gilg 5304010

Gilg: 343 (1917); Killick: 70 (1976).

Pseudoscolopia E.Phillips: 416 (1926) name illegitimate.

Shrubs or small trees. **Leaves** opposite, petiolate; blade elliptic, serrate; stipules 0. **Inflorescence** a lax, axillary cyme. **Flowers** bisexual. **Sepals** 4, valvate in bud, persistent. **Petals** 4, subsimilar to sepals, imbricate in bud, persistent. **Stamens** many; filaments free; anthers arcuate. **Ovary** superior, ovoid-globose, 1-locular with 2 or 3 parietal placentas and 1 ovule on each placenta, pubescent; style terete, 2- or 3-fid at apex. **Fruit** a 2- or 3-valved capsule, ovoid, with persistent style. **Seeds** ellipsoid, covered with stellate hairs; embryo straight; cotyledons flat, somewhat obovate; endosperm sparse.

Monotypic: *Pseudoscolopia polyantha* Gilg, confined to sthn Afr.: N KwaZulu-Natal to Eastern Cape border and isolated in kloof in Piketberg District of Western Cape.

Rawsonia Harv. & Sond. 5275000

Harvey & Sonder: 67 (1860); Sim: 12 (1909); Engler: 559 (1921); Gilg: 394 (1925); Wild: 262 (1960); Bamps: 4 (1968); Killick: 54 (1976).

Evergreen shrubs or small trees. **Leaves** alternate, shortly petioled; blade usually elliptic, coriaceous, margins spinulose-serrate; stipules apparently extant (scar present). **Flowers** bisexual or male, in axillary spike-like racemes. **Sepals** 4 or 5, free, unequal, imbricate, concave. **Petals** similar to sepals but larger, with a petaloid scale opposite each petal with a gland on inner face at base. **Stamens** many, in several rows, inner hypogynous, outer attached to base of scales. **Ovary** superior, 1-locular, with a thick fleshy wall; ovules many on 4 or 5 parietal placentas; style almost 0; stigmas 4 or 5. **Fruit** a globose berry. **Seeds** few, subglobose: testa leathery; embryo straight; cotyledons thin, elliptic; endosperm fleshy, copious.

Species probably only 2, tropical and sthn Afr., only *Rawsonia lucida* Harv. & Sond. in sthn Afr., Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Scolopia Schreb. 5304000

Schreber: 335 (1789) name conserved; Sim: 125 (1907); Gilg: 418 (1925); Wild: 276 (1960); Bamps 39 (1968); Sleumer: 26 (1972b); Killick: 63 (1976).

Xylosma G.Forst.: 72 (1786). *Phoberos* Lour.: 317 (1790); Harvey: 67 (1860).

Armed or unarmed shrubs or trees. **Leaves** alternate, petiolate or subsessile; blade elliptic, ovate or subrotund, entire or toothed; stipules minute, caducous. **Flowers** bisexual, in axillary racemes, spikes, fascicles or flowers solitary in axils. **Receptacles** usually funnel-shaped. **Sepals** 4–6. **Petals** 4–6, but not always present, alternating with sepals. **Disc** fleshy, with marginal glands. **Stamens** many, borne on surface of disc, longer than petals at anthesis; anthers 2-thecous, often apiculate. **Ovary** superior, 1-locular, with few ovules on 2–5 parietal placentas; style simple, longish; stigma subcapitate or 2–5-lobed. **Fruit** a fleshy berry with several seeds and remains of sepals, petals and stamens at base and style at apex. **Seeds** suborbicular; testa leathery; embryo straight; cotyledons flat, elliptic-oblong; endosperm fleshy or somewhat horny. $x = 11$ (1 report).

Species ± 37, Africa, Madagascar, Comores, Mascarenes, Malaysia and Australia; 5 in sthn Afr., in all countries and provinces.

Trimeria Harv. 5315000

Harvey: 417 (1838); Harvey: 68 (1860); Sim: 132 (1907); Wild: 296 (1960); Sleumer: 302 (1974); Killick: 77 (1976).

Shrubs or trees, dioecious. **Leaves** alternate, simple, petiolate; blade ovate or orbicular, 3–9-nerved from

base; stipules sometimes foliose, caducous. **Flowers** unisexual, small, in axillary racemes, spikes or panicles. **Male flowers**: sepals 3–5, with marginal disc glands opposite each sepal; stamens 9–16, inserted in 3s or 4s alternating with disc glands; anthers small, subglobose. **Female flowers**: sepals and petals ± as in male; ovary superior, 1-locular, with 1 or 2 ovules on 3 parietal placentas; styles 3, short, persistent. **Fruit** a dry, 3-valved capsule, 1–3-seeded. **Seeds** ellipsoid, testa leathery.

Species 5, Africa; 3 in tropical East Africa and Zimbabwe; 2 in sthn Afr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Eastern and S Western Cape as far as George.

Xylotheca Hochst. 5284010

Hochstetter: 69 (1843); Gilg: 402 (1925); Wild: 272 (1960); Killick: 58 (1976); Hul & Breteler: 255 (1997).

Oncoba Forssk. in part: 103 (1775); Harvey: 66 (1860).

Shrubs or trees, unarmed. **Leaves** alternate, petiolate; blade elliptic to broadly elliptic or obovate; stipules present. **Flowers** male or bisexual, solitary, cymose or subumbellate in upper leaf axils or terminal on branchlets, large, sweet-scented. **Calyx** of usually 3 sepals, concave, free or almost free, imbricate, glabrous or pubescent. **Petals** 7–14, free or narrowed to base, imbricate. **Stamens** many; filaments free; anthers linear, dehiscing longitudinally from above. **Ovary** rudimentary in male flowers, 1-locular, multiovulate; ovules pendulous from ± 7 parietal placentas; style terminal; stigmas equalling number of placentas, short, spreading. **Fruit** a woody capsule, splitting into ± 8 longitudinal valves; style persists as hard woody point. **Seeds** many, sometimes with a resinous aril.

Species ± 10, Africa, Madagascar; 1 in sthn Afr.: *Xylotheca kraussiana* Hochst., Northern Province, Mpumalanga, KwaZulu-Natal.

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Frankeniaceae

(Dilleniidae—Violales)

Compiled by C.L. Bredenkamp

Halophytic, low, spreading, woody shrublets, rarely annuals, often hairy and salt-encrusted. **Leaves** opposite, decussate below, in verticils of 4 above, with leaf clusters (from suppressed branchlets) bearing flowers in their axils, sessile, subsessile or shortly petiolate, connected by an amplexicaul, usually ciliate, stipular ridge or sheath; lamina small, linear to ovate, flat or with margins rolled back, often tightly so and thus terete or sausage-shaped, glabrous or pubescent, punctate. **Flowers** regular, usually bisexual, in forks of branches (determinate), sessile, small, persistent, scattered all over or aggregate in terminal dichasia (leaves subtending flowers in dichasia not differing from ordinary leaves). **Calyx** tubular, induplicate, 4- or 5-fid with prominent ribs, glabrous, puberulous and occasionally with long scattered setae. **Petals** 5, free, imbricate, with an adnate scale or ligule attached to inside of claw, pink, mauvy pink or white. **Stamens** 6 (rarely 4 or 5); filaments connivent and expanded below, filiform above; anthers 2-locular, 2-partite or nearly so, versatile. **Ovary** superior, 1-locular, with parietal placentas bearing 1–many ovules; style terete, with 3 stigmatic lobes. **Capsule** enclosed in calyx, dehiscing longitudinally, ovoid to narrowly ovoid. **Seeds** small, ellipsoid-fusiform, papillate or smooth, albuminous, maturing very early. $x = 5$ (polyploidy).

Genera 2, species 81, cosmopolitan; sthn Afr.: genus 1 (*Frankenia*, the largest and most widespread), species 3.

Harvey: 3 (1860); Roessler & Schreiber: 1 (1968); Obermeyer: 32 (1976).

Frankenia L. 5233000

Linnaeus: 331 (1753); Linnaeus: 154 (1754); Harvey: 114 (1860); Roessler & Schreiber: 1 (1968); Obermeyer: 33 (1976).

Description as for family.

Species ± 80, Mediterranean, along the Atlantic seaboard, western and southern parts of Africa and Australia (± 45 species) to Asia and the Americas; 3 in sthn Afr., two endemic, the third almost cosmopolitan and weed-like in behaviour. Halophytes, usually gregarious, found along the coast and further inland, rarely in nonsaline habitats.

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Fumariaceae

(Magnoliidae—Papaverales)

Compiled by M. Jordaan

Annual, ± glabrous herbs with watery sap, often climbing by means of tendrils, often slightly fleshy, arising from a taproot, sometimes with one-celled hairs. **Leaves** alternate, compound, pinnately to ternately divided, often ending in a tendril; petiole sometimes vaginate at base or with membranous appendages; stipules 0. **Inflorescences** terminal racemes on flowering stems, pedunculate; bracteate. **Flowers** bisexual, irregular or disymmetric, small. **Sepals** 2, petaloid or herbaceous, often scale-like, sometimes hyaline, large and ovate, not covering petals in bud, soon deciduous. **Petals** 4, outer and inner whorl very dissimilar, imbricate, ± connivent, 2 outer often saccate or spurred at base, 2 inner narrower and sometimes coherent at apex. **Stamens** 2 or 4, free and opposite petals, or 6 connate into 2 bundles; filaments broad, hyaline or petaloid, nectariferous at base; anthers connivent, adhering to stigma, median anthers 2-thecous, lateral anthers 1-thecous, rounded-elliptic to oblong, dehiscing by slits. **Ovary** superior, of 2 carpels, syncarpous, 1-locular, with parietal placentation; ovules 1–many, pendulous, campylotropous, bitegmic, crassinucellate; style slender; stigma 1, compressed, with 2 lobes or apical horns, and/or 2–8 papillar stigmatic surfaces. **Fruit** various, capsular or a nut, sometimes bladdery or membranous. **Seeds** 1–many, small, usually shiny, with or without a crest.

Genera ± 17; species ± 530; mainly in northern, temperate regions; sthn Afr.: genera 4 (1 exotic), species 9 (2 exotic).

Candolle: 105 (1821); Chamisso & Schlechtendal: 556 (1826), as Fumariaceae; Endlicher: 858 (1839), as Papaveraceae subfamily Fumarioideae; Fedde: 5 (1936), as Papaveraceae; Lidén: 42 (1986), as Fumariaceae; Lidén: 310 (1993), as Fumariaceae.

Key to genera

1a Plants without tendrils; fruit ± globose, 1-seeded ..... ***Fumaria**

1b Plants with tendrils; fruit a many-seeded bladdery capsule or, if 1-seeded, ± discoid or trigonous:

2a Fruit a many-seeded bladdery capsule ..... **Cysticapnos**

2b Fruit a small nut:

3a Pedicels very short; fruit ± discoid with persistent style ..... **Discocapnos**

3b Pedicels long, hair-like; fruit trigonous with caducous style ..... **Trigonocapnos**

Cysticapnos Mill. 2858020

Miller: [427] (1754); Endlicher: 860 (1839); Harvey: 16 (1860) under *Corydalis*; Fedde: 285 (1924); Fedde: 136 (1936); Adamson: 405 (1950); Lidén: 105 (1986); Lidén: 316 (1993).

Phacocapnos Bernh.: 664 (1838).

Soft, annual, glabrous herbs, climbing with tendriliform ultimate leaflets. **Inflorescence**: pedicels short; bracts small, partly scarious. **Flowers** 2-lipped, white or rosy pink. **Sepals** lateral, persistent, much shorter than petals, scale-like. **Petals** free at base, partly connate at tips, posterior one prolonged into a very short, obtuse spur; tube when present shortly campanulate. **Stamens** 6, in 2 groups, filaments of each group variously fused, lateral, 3-fid. **Ovary** sometimes shortly and bluntly stalked, elliptic or oblong, with 2 narrow keels; ovules many; style linear; stigma ± capitate, sometimes deeply cleft or with 2 simple papillae. **Fruit** a membranous capsule (vesicular in *C. vesicaria* (L.) Fedde), thin-walled, inflated, ovoid, up to about 30 mm long, splitting from apex. **Seeds** many, small, lenticular, with a black, shiny testa, without elaiosomes. $x = 7, 8$ (polyploidy).

Species 5, confined to sthn Afr.: S Namibia, Mpumalanga, Free State, KwaZulu-Natal, Lesotho, Northern Cape (Namaqualand, including Richtersveld), Western and Eastern Cape.

Discocapnos Cham. & Schltdl. 2861010

Chamisso & Schlechtendal: 569 (1826); Endlicher: 860 (1839); Harvey: 18 (1860); Fedde: 144 (1936); Adamson: 406 (1950); Lidén: 104 (1986); Lidén: 316 (1993).

Soft, climbing, ± glabrous annual herbs, with tendriliform ultimate leaflets. **Inflorescences** many-flowered racemes, opposite upper leaves, peduncles lengthening as fruit ripens; pedicels very short, equal. **Flowers** small, pink, with short triangular spur. **Petals**: posterior one spurred at base, inner ones with forwardly projecting prominent triangular wings. **Ovary** elliptic; style filiform, curved; stigma with two small erect papillae. **Fruit** (utricle) 1-seeded, orbicular, flattened, membranous, with a central nerve and margin wing-like, indehiscent, tipped with base of persistent style. **Seed** lenticular, beaked, shiny, with thick black testa.

Monotypic; sthn Afr.: *Discocapnos mundtii* Cham. & Schltdl., Western Cape.

*Fumaria L. 2861000

Linnaeus: 699 (1753); Linnaeus: 314 (1754); Chamisso & Schlechtendal: 568 (1826); Endlicher: 861 (1839); Harvey:18 (1860); Fedde: 141 (1936); Exell: 181 (1960); Henderson & Anderson: 148 (1966); Meikle: 88 (1977); Lidén: 42 (1986); Lidén: 310 (1993); Stern: 356 (1997).

Annual herbs, often with slender, flexuose, sprawling or climbing stems from taproots. **Leaves** all cauline, four

times pinnately divided, sometimes with sensitive petiolules; petioles often twining. **Inflorescence** an elongated raceme, terminal on main stem and leaf-opposed branches; pedicels short; bracts usually persistent. **Flowers** bilaterally symmetric, white or pink to purple. **Sepals** peltate with attachment near base, ovate, base rounded, margin ± lacerate, apex acute to acuminate. **Petals**: upper petal spurred, 2 inner petals and a lower petal not spurred. **Stamens** 6, in 2 bundles of 3; filaments of each bundle completely connate, adhering basally to petals. **Ovary** superior, ovoid; ovules 1 or 1 on each placenta; style promptly deciduous after anthesis, elongate; stigma with two big papillae. **Fruit** an indehiscent nutlet, globular, hard-walled, with two apical pits. **Seed** 1, with thin brown testa; endosperm with a hemisperical apical depression; elaiosome 0. $x = 7, 8$ (high polyploidy).

Species ± 50; mostly Mediterranean, also to central Asia and 1 in the Himalayas, Atlantic islands, 1 in tropical Africa; 2 in sthn Afr.: **Fumaria muralis* Sond. ex Koch subsp. *muralis* (most common one) and **F. parviflora* Lam.; widespread weeds, often in lucerne lands.

Trigonocapnos Schltr. 2862000

Schlechter: 131 (1899); Fedde: 140 (1936); Lidén: 105 (1986); Lidén: 316 (1993).

Soft, annual, glabrous, climbing herbs, with tendriliform ultimate leaflets. **Inflorescence** a slender raceme 70–100 mm long, up to 30-flowered, opposite upper leaves; pedicels long and capillary, usually curved near apex with age. **Flowers** small, pink, with short ascending triangular spur. **Calyx** minute, 2-segmented. **Petals**: posterior one spurred at base. **Fruit** small, ± oblong, 3–4 mm long, asymmetrical, trigonous with caducous style. **Seed** 1, oblong with thin brown testa.

Monotypic: *Trigonocapnos lichtensteinii* (Cham. & Schltdl.) Lidén, Northern Cape (Niewoudtville and Sutherland), Western Cape (Vanrhynsdorp to Clanwilliam).

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Geissolomataceae

(Rosidae—Celastrales)

Compiled by C.L. Bredenkamp

Xeromorphic, evergreen shrublets or shrubs with somewhat 4-angled branchlets. **Leaves** decussate, simple, subsessile, cordate-ovate, silky when young, glabrescent; stipules petiolar, minute. **Flowers** bisexual, regular, 4-merous, in short, much-branched, bracteate, axillary racemes along upper twigs; bracts 4 or 6, 2 lowest smallest, persistent; axillary bracteoles sometimes present. **Perianth** 4-partite, persistent, rose-coloured; segments imbricate, 2 outer clasping the inner. **Stamens** 8, arising from base of perianth and slightly shorter than it; filaments linear; anthers elliptic, dorsifixed, versatile, 2-thecous, bilobed at base. **Ovary** superior, 4-locular, narrowly 4-winged, with 2 collateral, pendulous ovules in each locule, rarely 1 ovule aborted; styles 4, twisted at base, narrowed and cohering upwards, longer than ovary; stigmas small. **Fruit** a 4-locular capsule, dehiscing by 4 longitudinal sutures on wings of locules. **Seed** single in each locule, whitish, smooth, shiny, with brittle testa.

Genus 1, species 1, Western Cape.

Jussieu: 15 (1846); Stephens: 98 (1915); Dahlgren & Rao: 207 (1969).

Geissoloma Lindl. ex Kunth 5422000

Kunth: 678 (1830); Stephens l.c.; Dahlgren & Rao l.c.

Description as for family.

Species 1: *Geissoloma marginatum* (L.) A.Juss., Western Cape: Swellendam to Riversdale District.

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Gentianaceae

(Asteridae—Gentianales)

Compiled by C.L. Bredenkamp & J.E. Victor

Annual, biennial or perennial herbs, erect or straggling, rarely shrublets or trees. **Leaves** mostly opposite, sometimes verticillate, very rarely alternate; stipules 0. **Inflorescence** cymose or rarely racemose, flowers sometimes solitary or crowded into fascicles or globose heads, rarely verticillate (*Enicostema*). **Flowers** bisexual or rarely unisexual, regular or rarely slightly irregular, (3)4- or 5(6–16)-merous, often heterostylous. **Calyx** mostly gamosepalous, usually with a short to well developed tube and imbricate or sometimes valvate or open lobes, sometimes lobes much reduced or suppressed, rarely sepals nearly free. **Corolla** gamopetalous, usually with contorted lobes, usually as many as calyx lobes. **Stamens** arising on corolla tube or in throat, free or rarely connate by anthers, as many as corolla lobes and alternating with them; anthers sometimes twisted, opening by longitudinal slits, rarely by terminal pores (*Exacum*). **Disc** 0, annular or of 5 hypogynous glands. **Ovary** superior, either 1-locular with parietal placentas, or 2-locular by intrusion of locular walls and with axile placentation. **Fruit** a capsule, dehiscing septicidally, rarely berry-like, usually many-seeded. **Seeds** few to many, with fleshy or oily endosperm.

Genera 89, species ± 1200, fairly cosmopolitan and mostly in temperate and subtropical regions; sthn Afr.: genera 9, species 70. *Nymphoides* (6545000) and *Villarsia* (6544000) are dealt with under Menyanthaceae. *Faroa salutaris* Welw. is recorded from sthn Afr. by Marais & Verdoorn (1963) and by Paiva & Nogueira (1990). No specimens of this species from sthn Afr. were seen.

Baker & Brown: 544 (1903); Marais & Verdoorn: 171 (1963); Friedrich-Holzhammer: 1 (1967); Paiva & Nogueira: 3 (1990); Takhtajan: 426 (1996).

Key to genera

1a Trees or shrubs ..... **Anthocleista**
1b Herbs or suffrutices:
2a Ovary 2-locular through intrusion of locular wall, the placentas eventually appearing axile:
3a Flowers mainly blue, rarely pink or white; corolla tube short, broadly cylindrical; anthers coriaceous ..... **Exacum**
3b Flowers mainly yellow, sometimes cream or white; corolla tube cylindrical or funnel-shaped; anthers membranous… ..... **Sebaea**
2b Ovary 1-locular, with parietal or sometimes intrusive placentas:
4a Flowers 3-merous ..... **Pycnosphaera**
4b Flowers 4- or 5-merous:
5a Corolla lobes without nectaries:
6a Flowers sessile or subsessile, solitary or in axillary clusters or heads:
7a Flowers in clusters in axil of each bract ..... **Enicostema**
7b Flowers solitary, rarely 2 together in axil of a floral bract ..... **Neurotheca**
6b Flowers in terminal, simple or compound cymes:
8a Calyx keeled; plants glabrous ..... **Chironia**
8b Calyx without keels; plants pubescent ..... **Orphium**
5b Corolla lobes with fringed nectaries near their base; flowers in lax cymes ..... **Swertia**

Anthocleista Afzel. ex R.Br. 6466000

Brown: 449 (1818); Leeuwenberg: 1 (1961); Verdoorn: 135 (1963) under Loganiaceae; Van Wyk & Van Wyk: 276 (1997) under Loganiaceae.

Trees, tall, deciduous, with straight, clean bole. **Leaves** opposite, usually large, 0.13–1.15 m long, oblong, narrowing towards base in lower half, clustered at ends of branches, glabrous. **Inflorescence** terminal in trichotomously branched, cymose panicles with stout branches. **Flowers** large, white or dull yellow. **Calyx** deeply 4-lobed, coriaceous, imbricate. **Corolla** with tube usually ± cylindric; lobes 8–16, linear, lanceolate, or oblong-linear, imbricate and contorted. **Stamens** as many as corolla lobes; filaments united at base to form a short ring or cup; anther cells parallel. **Ovary** on a fleshy disc, 2-locular or spuriously 4-locular with many ovules in each locule; style long or short; stigma oblong, globose or shortly cylindric. **Fruit** a subglobose or oblong-ellipsoid berry with coriaceous pericarp. **Seeds** many, minute, embedded in fleshy placentas. $x = 6$ (10, 15) (high polyploidy).

Species ± 50 mostly in tropical Africa, Madagascar and Mascarene Islands; 1 in sthn Afr.: *Anthocleista grandiflora* Gilg; subtropical forest of Northern Province, Mpumalanga and Swaziland.

Chironia L. 6503000

Linnaeus: 189 (1753); Hill & Prain: 1096 (1909); Marais & Verdoorn: 212 (1963); Hilliard & Burtt: 303 (1983); Paiva & Nogueira: 32 (1990).

Annuals, suffrutices, rarely shrublets. **Stems** erect to straggling, simple or branched at apex, occasionally much-branched, rarely radicant. **Leaves** cauline and in a basal rosette (sometimes soon deciduous); the cauline ones opposite, usually in distant pairs, linear, linear-lanceolate, ovate-lanceolate to ovate-cordate, sometimes much reduced, sessile, or amplexicaul, rarely cuneate to a petiole-like base. **Flowers** in a lax, few- to many-flowered cyme, sometimes solitary. **Calyx** 5-lobed, lobes with a distinct midrib, sometimes with a keel decurrent on tube as a wing, without basal glands. **Corolla**: tube campanulate or cylindric; lobes 5, contorted in bud, spreading, usually as long as or longer than tube, persistent and enfolding capsule like a cap, rose to magenta-pink, rarely white. **Stamens** 5, arising from throat of corolla; filaments short, usually flattened with a broad base; anthers straight or twisted. **Ovary** 1-locular, globose to cylindric-globose; placentation parietal; ovules many; style simple, terete, usually becoming hooked at apex; stigma subcapitate or 2-lobed. **Capsule** septici-

dally 2-valved, rarely berry-like. **Seeds** many, subglobose; testa foveolate. $x = 17$ (1 report, polyploidy).

Species ± 30 throughout tropical and subtropical Africa and Madagascar; 16 in sthn Afr., Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Northern and Eastern Cape

Enicostema Blume 6484000

Blume: 848 (1826); Hill & Prain: 1117 (1909); Marais & Verdoorn: 237 (1963); Paiva & Nogueira: 49 (1990).

Erect, perennial herbs. **Leaves** opposite. **Flowers** small, many, in axillary clusters. **Calyx** 5-lobed; lobes keeled. **Corolla** 5-lobed to ± midway or deeper, white, drying yellowish. **Stamens** 5, arising from corolla tube below sinuses; filaments with a double-hooded scale at base; anthers erect, not twisted, acute. **Ovary** 1-locular, obtuse; style short, subulate; stigma terminal, capitate. **Capsule** 2-valved, splitting septicidally. **Seeds** many, reticulate. $x = 19$.

Species 3, 1 from America, 1 from Madagascar, 1 from Africa and Asia; 1 in sthn Afr.: *Enicostema hyssopifolium* (Willd.) I.C.Verd., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland and N KwaZulu-Natal.

Exacum L. 6479000

Linnaeus: 112 (1753); Baker & Brown: 545 (1903); Marais & Verdoorn: 211 (1963); Klackenberg: 85 (1985); Paiva & Nogueira: 8 (1990).

Annual herbs, rarely perennial. **Leaves** entire. **Flowers** in dichotomous, terminal and axillary cymes. **Calyx** 4- or 5-lobed; lobes usually broadly winged. **Corolla** 4- or 5-lobed, blue, pink or white; tube short, broadly cylindrical. **Stamens** 4 or 5, arising below sinuses; anthers dehiscing by terminal pores or slits. **Ovary** 2-locular by intrusion of locular walls; style short; stigma capitate. **Capsule** 2-valved, globose; placenta appearing axile. **Seeds** many, minute. $x = 17, 31$ (9, 14, 15) (polyploidy).

Species 65, mainly in Madagascar, Socotra, Sri Lanka and S India, but also SE Asia, New Guinea and Australia, 2 on African continent; 1 in sthn Afr.: *Exacum oldenlandioides* (S.Moore) Klack., Northern Province and Mpumalanga.

Neurotheca Salisb. ex Benth. 6491000

Bentham: 812 (1876); Baker & Brown: 559 (1903); Paiva & Nogueira: 4 (1990).

Herbs, mainly rather wiry annuals. **Leaves** opposite. **Flowers** solitary, rarely 2 in each axil, in long or short racemes or crowded in terminal corymb-like clusters. **Calyx** tubular, 4-lobed, 8–12-ribbed. **Corolla** white, 4-lobed; tube narrowly funnel-shaped or cylindric; lobes ovate, contorted. **Stamens** 4, arising below middle of corolla tube and reaching to its mouth or slightly exserted. **Ovary** 1-locular, oblong; placentas very slightly intruded; ovules many; style filiform; stigma 2-lobed. **Capsule** 2-valved, membranous. **Seeds** minute, reticulate. $x = 15$ (1 report).

Species 3, tropical Africa; 1 in sthn Afr.: *Neurotheca schlechteri* Gilg ex Baker & N.E.Br., KwaZulu-Natal.

Orphium E.Mey. 6504000

Meyer: 181 (1837); Hill & Prain: 1095 (1909); Marais & Verdoorn: 236 (1963).

Suffrutices, erect, virgately branched, ± pubescent; branches leafy to apex. **Leaves** opposite, sessile, rather crowded. **Inflorescence** a lax cyme, terminal or in axils of upper leaves, sometimes flowers solitary. **Calyx** 5-lobed, fitting loosely round corolla base; tube short, campanulate, with annular, crenulate disc at base within; lobes oblong, mucronate, without a dorsal keel. **Corolla** deep pink, rarely white; tube as long as or slightly longer than loosely enveloping calyx; lobes 5, oblong to suborbicular, slightly longer than tube. **Stamens** 5, arising below mouth of tube; anthers erect, slightly spirally twisted. **Ovary** 1-locular, with parietal placentation, oblong-elliptic in outline, shortly narrowing into a long style; stigma terminal, peltate. **Capsule** splitting septicidally.

Species 1: *Orphium frutescens* (L.) E.Mey., Western Cape.

Pycnosphaera Gilg 6486000

Gilg: 333 (1903); Baker & Brown: 565 (1903); Paiva & Nogueira: 47 (1990).

Annual or perennial herbs. **Stems** erect, unbranched or corymbosely branching at apex. **Leaves**: basal leaves oblong-lanceolate or oblong-elliptic; stem leaves from elliptic (lower ones), oblong-lanceolate (middle), to linear or linear-oblong (upper), entire. **Inflorescence** dense bracteate heads, solitary or corymbosely arranged at end of stems and branches. **Calyx** unequally 3-partite; lobes carinate. **Corolla** blue; tube cylindric, with 3 spreading lobes. **Stamens** 3; filaments filiform, arising from sinuses of corolla lobes, dilated into a small hood at their base; anthers cylindric-ovoid. **Ovary** 1-locular, narrowly ellipsoid; ovules many; style filiform; stigmas 2, linear-oblong. **Capsule** 2-valved, oblong-elliptic. $x = 15$ (1 report).

Monotypic, tropical Africa: *Pycnosphaera buchananii* (Baker) N.E.Br., Botswana (Okavango Swamps).

Sebaea Sol. ex R.Br. 6481000

Brown: 451 (1810); Hill & Prain: 1057 (1909); Marais & Verdoorn: 172 (1963); Hilliard & Burtt: 277 (1982); Hilliard & Burtt: 304 (1983); Paiva & Nogueira: 10 (1990).

Lagenias E.Mey.: 186 (1837). *Belmontia* E.Mey.: 183 (1837). *Exochaenium* Griseb.: 55 (1845); Hill & Prain: 1093 (1909).

Annual, biennial, or perennial herbs, erect or procumbent; stems frequently 4-angled or -winged, glabrous, papillose-puberulous, or scabrid along angles. **Leaves** opposite, radical or cauline, well developed or reduced, linear-lanceolate to suborbicular, often sessile and cordate at base. **Flowers** borne in 1–many-flowered cymes; cymes solitary or arranged in corymbs. **Calyx** 4- or 5(6)-segmented or shortly tubular; segments lanceolate to ovate or obovate, frequently with thin, hyaline margin, entire or ± erose, keeled or winged, sometimes papillose, bristly or scabrid along keels or wings. **Corolla** 4- or 5(6)-lobed, yellow, cream or white; tube cylindric or funnel-shaped, long or short; lobes spreading, contorted in aestivation, frequently clawed. **Stamens** 4 or 5; filaments short or long, arising in corolla sinuses or in tube; anthers included in corolla tube or exserted, with 0–3 minute or conspicuous glands. **Ovary** 2-locular with many axile ovules, ovoid, obovoid, or almost globose; style filiform, included or exserted, often with additional stigmatic swellings which are free from or confluent with stigma; stigma capitate, clavate, or long-linear, 2-lobed or entire. **Capsule** septicidally 2-valved, ovoid or obovoid, membranous or coriaceous. **Seeds** ridged or frilled.

Species ± 159, mainly Africa and Madagascar, 1 extending to India and China, 2 in Australia and New Zealand; 53 in sthn Afr., widespread in temperate habitats, Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Northern and Eastern Cape.

Swertia L. 6512000

Linnaeus: 226 (1753); Hill & Prain: 1118 (1909); Marais & Verdoorn: 240 (1963); Paiva & Nogueira: 26 (1990).

Annual or perennial herbs. **Leaves** opposite, sessile, cauline and basal; basal leaves often narrowed at base

into a petiole and often disappearing early or undeveloped; cauline leaves usually distant. **Flowers** in terminal cymes. **Calyx** 4- or 5-lobed, divided almost to base. **Corolla** 4- or 5-lobed, divided almost to base, white, blue, or yellow. **Stamens** 4 or 5, arising in sinuses, shorter than corolla lobes; anthers small. **Ovary** 1-locular, oblong in outline; style short or none; stigma 2-lobed. **Capsule** 2-valved, splitting septicidally. $x = 13$ (7, 8, 9, 10, 11, 12) (polyploidy, B-chromosomes).

Species ± 100, Europe and America; 1 in sthn Afr.: *Swertia welwitschii* Engl. (= *S. stellarioides* (Welw.) Ficalho); Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Lesotho.

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Geraniaceae

(Dilleniidae—Malvales)

Compiled by L.L. Dreyer & A.M. Makwarela

Herbs, geophytes, subshrubs or shrubs; stems often with jointed nodes; usually with aromatic oils in multicellular, capitate-glandular hairs. **Leaves** opposite or alternate, usually lobed, often palmately or pinnately dissected or compound, rarely simple and ± entire; stipules usually present. **Flowers** bisexual, regular or irregular; on 1- or 2-flowered peduncles or in few- to many-flowered cymose or umbellate inflorescences, rarely solitary and axillary; bracts present or 0. **Sepals** (4)5, free or rarely connate to middle, imbricate, rarely valvate, sometimes (*Pelargonium*) with a tubular, nectariferous spur ± fused with pedicel. **Petals** (2, 4)5 (or 0 by abortion), free, equal or unequal, hypogynous or subperigynous, imbricate, rarely contorted. **Disc** of 5 nectary glands outside stamens alternating with petals often present, but 0 in *Pelargonium* which has a nectariferous tube. **Stamens** usually twice (rarely 3 times) as many as petals, sometimes reduced to 2, all fertile or some sterile; filaments free or ± connate at base, sometimes connate into 5 bundles of 3 each; anthers versatile, 2-thecous, opening by longitudinal slits. **Ovary** superior, consisting of (2)3–5 1-locular carpels with slender styles fused around a central axis (beak, rostrum or carpophore) enlarging in fruit; with 1 or 2 pendulous, axile ovules per locule; styles free at top, with ligulate to clavate, rarely capitate stigmas. **Fruit** a 3–5-lobed, rarely 8-lobed schizocarp, breaking up from base of beak into 1(2)-seeded mericarps, usually with persistent, elastic styles as long awns often twisting spirally. **Seeds**: embryo usually curved; endosperm 0 or sparse.

Genera 11, species ± 800, fairly cosmopolitan in subtropical and temperate regions; sthn Afr.: genera 5, species ± 290.

Harvey: 254 (1860); Knuth: 129 (1912); Müller: 130 (1963); Merxmüller & Schreiber: 64 (1966); Van der Walt: 1 (1977); Van der Walt & Vorster: 1 (1981); Van derWalt &Vorster: 1 (1988).

Key to genera

1a Flowers irregular; stamens 10, usually only 2–7 with anthers ..... **Pelargonium**

1b Flowers regular or very nearly so; stamens 5–15, all perfect, or alternate ones without anthers:

2a Stamens 5 fertile and 5 staminodes ..... **Erodium**

2b Stamens 10–15 fertile:

3a Stamens 10 ..... **Geranium**

3b Stamens 15:

4a Stems herbaceous or slightly woody, rarely subsucculent, without spines ..... **Monsonia**

4b Stems thick and ± succulent; petioles spinescent ..... **Sarcocaulon**

Erodium L'Hér. 3927000

L'Héritier: 414 (1789); Harvey: 258 (1860); Knuth: 221 (1912); Venter & Verhoeven: 79 (1990).

Rosulate or caulescent herbs or shrublets; stems pilose, hirsute or hispid and glandular. **Leaves** alternate, subopposite or opposite, those of a pair unequal, smaller ones with lateral branch and/or inflorescence in axil; petiolate; lamina simple or compound, elliptic, very broadly ovate to oblong-ovate or deltate-ovate; pinnae ovate or obliquely ovate, dentate to serrate; stipules usually paired. **Inflorescence** a cymose pseudo-umbel; bracts ovate or subulate, mostly scarious, whitish to straw-coloured. **Flowers** regular, hypogynous. **Sepals** 5, free, persistent, enlarged around fruit. **Petals** 5, obovate, apex

obtuse; white, pink or violet. **Stamens** 10; 5 fertile, free, hypogynous, antisepalous, alternating with 5 staminodes; anthers introrse, oblong-elliptic. **Disc** of 5 oblong glands, between fertile stamens and sepals. **Ovary** deeply 5-lobed, 5-locular, hispid, with 2 axile ovules per locule, lower ovule abortive; stigmas 5, filiform. **Mericarps** 5, 1-seeded; head obliquely ovoid, tapering towards spinose base, hispid with ascending hairs; awns crested, spirally twisted. **Seeds** brown. $x = 9$, 10 (7, 8) (polyploidy).

Species 60, Europe, Mediterranean to central Asia, temperate Australia and south tropical South America; 6 in sthn Afr., widespread.

Geranium L. 3924000

Linnaeus: 676 (1753); Harvey: 257 (1860); Knuth: 43 (1912); Hilliard & Burtt: 171 (1985).

Annual or perennial herbs or occasionally undershrubs; branches often jointed. **Leaves** opposite or alternate, palmately lobed or dissected, with segments variously lobed to entire; petiolate; stipulate. **Flowers** regular, 1- or 2-nate on axillary peduncles; peduncle rarely aborted. **Sepals** 5, imbricate, usually apiculate, usually pubescent and often with glandular hairs and 3 prominent veins. **Petals** 5, sessile, hypogynous, imbricate, usually obovate and notched on apical margin and with few hairs at base. **Disc** of 5 glands alternating with petals. **Stamens** 10, usually in 2 series, rarely 5 anthers aborted; filaments shortly connate or free. **Ovary** 5-locular, 5-lobed, with 2 ovules per locule, usually with gland at base of each locule, usually villous. **Mericarps** 1-seeded; awns arched, generally glabrous. **Seeds** often oblong in outline, sometimes with 2 depressions; testa with lace-like markings. $x = 7$ (8, 9, 10, 11, 13, 17) (high polyploidy, B-chromosomes).

Species 300, temperate regions, montane tropics; 31 in sthn Afr., widespread.

Monsonia L. 3925000

Linnaeus: 507, 508 (1767); Harvey: 254 (1860); Knuth: 290 (1912); Venter: 1 (1979).

Prostrate, decumbent or erect, suffrutescent or annual, glanduliferous, hairy herbs; stems herbaceous to woody, terete or somewhat compressed. **Leaves** alternate, subopposite or opposite, pairs mostly unequal; lamina simple (rarely compound), palmately or pinnately veined; petiolate; with paired stipules. **Inflorescence** cymose, subumbellate, bracteate, 1–15-flowered. **Flowers** regular. **Sepals** 5, free or connate, imbricate, persistent, margin membranous, apex mucronate, with concealed spurs or pouches when connate. **Petals** 5, free, imbricate or contorted, main veins palmately arranged. **Stamens** 15, mostly all perfect, monadelphous, in 5 basely connate groups or rarely pentadelphous with 5 groups of 3 basely connate filaments, less often all equal; filaments subulate, ciliate; anthers glabrous, dorsifixed. **Ovary** sessile or subsessile, deeply 5-lobed, 5-locular, with 2 ovules per locule; lower ovule abortive; stigmas 5, subterete and linear, inner side with papillose receptive surface. **Mericarps** 1-seeded, awns spirally twisted, crested or crested and plumose. **Seeds** brown, smooth or obscurely reticulate; embryo folded. $x = 9$, 12, 13 (1 report each).

Species ± 40, Africa, Madagascar and SW Asia; 20 in sthn Afr., widespread.

Pelargonium L'Hér. 3928000

L'Héritier: 417 (1789); Harvey: 259 (1860); Knuth: 316 (1912); Van der Walt: 1 (1977); Van der Walt & Vorster: 1 (1981); Van der Walt & Vorster: 1 (1988).

Perennial shrubs, subshrubs, acaulescent geophytes, scramblers, climbers or annual herbs; stems erect or decumbent, mostly herbaceous, sometimes woody, subsucculent or succulent, sometimes viscid, variously hairy, often glandular, sometimes with persistent spine-like stipules or petioles. **Leaves** alternate, entire to much dissected or compound, sometimes heteroblastic, variously hairy, usually petiolate, mostly glandular, often aromatic; stipulate. **Inflorescence**: branches with normal or smaller foliar leaves; pseudo-umbels (1)2–many-flowered; involucral bracts present; peduncles of varying lengths. **Flowers** irregular to almost regular. **Hypanthium** present, including nectariferous tube, ± fused with pedicel, which opens at base of posterior sepal, hypanthium base often thickened. **Sepals** 5, imbricate, connate at base, apices sometimes reflexed. **Petals** usually 5, rarely 4, seldom 2; posterior petals 2; anterior petals 0–3; petals imbricate, unguiculate or sessile, rarely lacerate. **Stamens** 10, connate at base, 2–7 fertile; anthers dorsifixed. **Ovary** 5-lobed, 5-locular, rostrate; ovules 2 per locule; style of varying length; stigmas 5, filiform and reflexed. **Mericarps** 1-seeded, tapering from apex to base, ending in a spirally twisted awn. **Seeds** ± oblong-ovoid; endosperm lacking; embryo curved. $x = 11$ (8, 9, 10) (high polyploidy).

Species ± 270, S, E and NE Africa, Asia, St Helena, Tristan da Cunha, Madagascar, Australia and New Zealand; ± 219 in sthn Afr., widespread but concentrated in Western Cape.

The genus *Pelargonium* has been under revision by the research team of the University of Stellenbosch since 1974. This project, coordinated by J.J.A. van der Walt, has resulted in numerous publications by various authors. Most of these were published either in the *South African Journal of Botany*, *Bothalia* or *Plant Systematics and Evolution*. Not all of these references are cited here, and the reader is referred to Dreyer & Germishuizen (1993) for a more comprehensive bibliography.

Sarcocaulon (DC.) Sweet 3926000

Sweet: 73 (1826); Harvey: 256 (1860); Knuth: 311 (1912); Rehm: 264 (1935); Moffett: 581 (1979).

Rigid, fleshy, perennial shrublets; branches covered with hard, waxy, translucent bark with or without persistent, spiny petioles. **Leaves** dimorphic: long- and short-petiolate; long-petiolate ones occurring singly, remaining as blunt or sharp spines; short-petiolate ones occurring singly or in tufts in axils of spines; lamina generally conduplicate, green or glaucous, cuneate, obcordate, elliptic, obovate or orbicular, toothed, lobed or segmented, deciduous; stipules semipersistent or caducous. **Flowers** regular, hypogynous, pedunculate, solitary, axillary; bracts 2, opposite. **Sepals** 5, free, imbricate, oblong-elliptic, margins membranous, mucronate or mucronulate. **Petals** 5, free, slightly ruffled, sessile, obovate or subtruncate at apex, apical margin undulate to erose, glabrous, sparsely pilose or ciliate; base clawed, hairy. **Stamens** 15, all perfect, monadelphous in 5 groups of 1 long and 2 short filaments each, fused at base; filaments sericeous towards base, tapering towards apex; anthers linear, extrorse, centrifixed. **Ovary** 5-carpellate, narrowly obovate, sericeous, with 2 ovules per locule; style glabrous or tomentose; stigmas 5. **Mericarps** 5, 1-seeded, base oblanceolate, sharp-pointed; awns thin, villous. **Seeds** exalbuminous. $x = 11$ (polyploidy).

Species 14, Africa; 14 in sthn Afr., widespread but concentrated in Namibia and Northern Cape. Albers (1996) places *Sarcocaulon* under *Monsonia*; but see Dreyer *et al.* (1997) and Moffett (1997).

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Gesneriaceae

(Asteridae—Scrophulariales)

Compiled by S.J. Smithies

Annual, perennial or monocarpic herbs, usually stemless, or rarely subshrubs, with uneven development of cotyledons. **Leaves** solitary, of cotyledonary origin, growing from meristem at base, or few or rosulate, opposite, rarely alternate; stipules 0. **Flowers** bisexual, irregular, usually in open pedunculate cymes, with flowers of each dichotomy paired and opening serially, sometimes reduced to 1 or 2; peduncles apparently arising from junction of midrib and leaf stalk (hypocotyl) or axillary. **Bracts** small, rarely foliaceous, very rarely 0. **Calyx** tubular and 5-lobed or divided to the base. **Corolla** tubular, 5-lobed, often ± bilabiate; limb oblique or rarely subequal, imbricate, with 2 posterior lobes often inside. **Stamens** 2, anterior, arising from corolla tube, usually included; anthers bithecate with thecae diverging, rarely parallel, usually cohering face to face, dehiscing longitudinally; staminodes 1 or 3. **Nectary/disc** annular or shortly cupular, rarely oblique or 0. **Ovary** superior, unilocular or apparently bilocular, usually slender, terete, rarely ovoid or conical, with 2 parietal placentas ± intruding and bifurcating, sometimes uniting centrally; ovules many; style simple; stigma variable. **Fruit** a capsule, often cylindrical, sometimes conical, spirally twisted, splitting loculicidally into 2, later sometimes 4 spiral valves. **Seeds** many, minute, ± ellipsoid; testa brown, reticulate or verruculose; endosperm ± 0. $x = 16$ (15).

Genera ± 139, species ± 2900, cosmopolitan but mainly Old World, especially China, mostly tropical and subtropical; sthn Afr.: 1 genus, species ± 45 (see Scrophulariaceae for *Charadrophila* Marloth).

Clarke: 437 (1904); Hilliard & Burtt: 43 (1988); Mabberley: 299 (1997).

Streptocarpus Lindl. 7823000

Lindley: t. 1173 (1828); Clarke: 438 (1904); Hilliard & Burtt: 1 (1971); Hilliard & Burtt: 43 (1988); Edwards, Kunhardt & Venter: 192 (1992); Hilliard: 75 (1992); Weigend & Edwards: 168 (1994a); Weigend & Edwards: 365 (1994b); Mabberley: 687 (1997).

Description as for family.

Species ± 125, Madagascar, tropical and sthn Afr., ± 45 in sthn Afr., mainly in eastern half; usually in cool, moist habitats, sometimes epiphytic.

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Gisekiaceae

(Caryophyllidae—Caryophyllales)

Compiled by L.L. Dreyer & M. Jordaan

Annual or perennial herbs with annual shoots, prostrate or ascending to erect, with several semisucculent stems often tinged with red, with numerous prominent, linear, whitish raphides especially on leaves, minutely asperous on nodes and inflorescence; containing betalains. **Leaves** opposite, linear to oblanceolate or elliptic, base sometimes attenuate into ill-defined petiole, margin entire; stipules 0. **Inflorescence** axillary or terminal, laxly dichasial-cymose to densely umbellate; peduncle present or absent; bracts minute or obsolete. **Flowers** bisexual or rarely unisexual, regular. **Se-**

pals 5, free. **Petals** (staminodes) 0. **Stamens** 5–15(–20), arising just below gynoecium; filaments free, widening below; anthers 2-thecous, opening by longitudinal slits. **Gynoecium** superior, apocarpous, of (3–)5(6) or 10–15 free carpels, each with solitary ovule and style on inner margin. **Fruit** a cluster of 3–15 ± heterocarpic mericarps: either muricate or almost smooth with thin, ventral sutures. **Seeds** thickly lens-shaped, black, microscopically pitted; embryo ± annular, peripheral; cotyledons oblong, fleshy; endosperm starchy. $x = 8$ or 9 (1 report, high polyploidy).

Genus 1, species 7, tropical and subtropical Africa, Arabia and Asia (S Vietnam), introduced elsewhere as a weed; sthn Afr.: genus 1, species 2.

Nakai: 91 (1942); Gilbert: 343 (1993a); Gilbert: 118 (1993b); Takhtajan: 111 (1997).

This family includes the single, isolated genus *Gisekia*, which has often been placed in either Aizoaceae (Adamson 1961; Jeffrey 1961), Phytolaccaceae (Walter 1909; Rohwer 1993; A.P.G. 1998) or Molluginaceae (Gonçalves 1978). It displays an anomalous set of characters, which complicates positive inclusion in any of these families (Gilbert 1993a).

Gisekia L. 2382000

Linnaeus: 554 (1771); Harvey: 155 (1860); Pax & Hoffman: 192 (1934); Phillips: 285 (1951); Adamson: 131 (1961); Friedrich: 26 (1966); Bogle: 435 (1970); Gonçalves: 304 (1970); Gonçalves: 522 (1978); Gilbert: 345 (1993a); Gilbert: 118 (1993b); Rohwer: 514 (1993).

Description as for family.

Species 7, tropical and subtropical Africa and Asia; 2 in sthn Afr., widespread in Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal and Northern Cape.

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Goodeniaceae

(Asteridae—Campanulales)

Compiled by W.G. Welman

Undershrubs, or rarely shrubs. **Leaves** alternate or radical, very rarely irregularly opposite, entire or toothed; stipules 0. **Flowers** bisexual, irregular, on dichotomously branched, axillary peduncles; bracts and bracteoles present. **Calyx** 5-lobed; tube adnate to ovary or rarely free; lobes persistent. **Corolla** 5-lobed, somewhat fleshy; tube split to base, villous within and with processes below sinuses; lobes digitately spreading, with glabrous wings as flower opens. **Stamens** 5, alternating with corolla lobes, free; filaments long, linear; anthers 2-thecous, with thecae parallel and opening longitudinally, with an apical projection. **Disc** present. **Ovary** inferior, 1- or 2-locular, with 1 or 2 erect or ascending, axile ovules in each locule; style simple, thick, semiterete; stigma truncate or 2-lobed, enclosed in a villous, ciliate cup. **Fruit** indehiscent, with a ± succulent or membranous exocarp and a hard endocarp. **Seeds** discoid with parchment-like testa. $x = 8$ (polyploidy).

Genera 16, species ± 430, mostly Australia, also New Zealand, antarctic South America, tropical Asia and Africa; sthn Afr.: genus 1, species 2.

Sonder: 532, 604 (1865); Launert: 85 (1983).

Scaevola L. 8716000

Linnaeus: 145 (1771) name conserved; Jeffrey: 537 (1980).

Description as for family.

Species ± 80, mostly Australia, few in Asia, the Pacific Islands and Africa; 2 in sthn Afr., coastal from KwaZulu-Natal to Western Cape.

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Greyiaceae

(Rosidae—Geraniales)

Compiled by R.H. Archer

Shrubs or small trees, with soft wood; ends of branchlets comparatively thick. **Leaves** alternate, crowded apically, petiolate, simple, subrotund, irregularly crenate, lobed; petiole sheathing; venation ± palmate at base; stipules 0.

Flowers bisexual, regular, showy, in terminal, pedunculate racemes; bracts small, lanceolate. **Calyx** 5-partite, persistent; segments oblong, imbricate. **Petals** 5, free, longer than sepals, oblong, glandular-ciliate, imbricate, red, rarely white. **Disc** fleshy, basin-shaped, 10-lobed, with lobes alternating with filaments and with a large gland at apex, or disc of 8 large, oblong structures lobed at apex and without glands. **Stamens** 10, in 2 rows, inserted between disc and ovary, longer than petals; filaments subterete; anthers 2-thecate, with longitudinal dehiscence. **Ovary** superior, 5-locular, oblong, deeply 5-grooved; ovules many, on parietal placentas; style simple. **Fruit** a 5-grooved, septicidal capsule. **Seeds** many, minute, elongated; endosperm copious. $x = 16$.

Genus 1, species 3, sthn Afr. Formerly included in Melianthaceae, but leaves simple and ovules many.

Hutchinson: 205 (1973); Dahlgren & Van Wyk: 29 (1988).

Greyia Hook. & Harv. 4855000

Hooker & Harvey: 138, t. 13 (1859); Harvey: 308 (1862) in Saxifragaceae; Dahlgren & Van Wyk: 29 (1988).

Description as for family.

Species 3, sthn Afr., Northern Province, Mpumalanga, KwaZulu-Natal and Eastern Cape (mainly Drakensberg and Mpumalanga escarpments).

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Grubbiaceae

(Dilleniidae—Ericales)

Compiled by M. Jordaan

Evergreen, much-branched woody shrubs or undershrubs, branched from a single stem and with a taproot, or branched from a lignotuber at ground level; branchlets longitudinally ridged, tomentose. **Leaves** opposite-decussate, ericoid or flat, entire, at least ± revolute, linear to lanceolate or obcuneate, acuminate, dull or greyish green, petiolate to nearly sessile; stipules 0. **Inflorescences** axillary, basically dichasial but congested, subtended by 2 or more bracts, with 2–20 flowers. **Flowers** bisexual, regular, very small. **Tepals** 4, small, distinct, calyx-like, externally densely white-hairy, internally glabrous, shiny, suffused pink to dark red, valvate, adnate to ovary. **Stamens** 8, free, in 2 whorls of 4 each, 4 opposite and attached to tepals at base; filaments linear-lanceolate, incurved; anthers basifixed, with 2 adaxial functional thecae and a pair of abaxial vestigial thecae each; thecae dehiscent by means of lateral slits. **Disc** epigynous, papillate to shortly hairy. **Ovary** inferior, 2-carpellate, 1-locular or incompletely 2-locular; ovule solitary in each locule, pendent, anatropous, unitegmic, tenuinucellar, with a long micropyle; placenta free or fused to wall; style erect, straight, unbranched, smooth, with 2 short apical lobes, but appearing simple. **Fruit** indehiscent, drupaceous, often reddish, with a fleshy exocarp and a sclerenchymatous endocarp, each fruit united with adjacent fruits in an inflorescence, forming a syncarp. **Seed** 1, ovoid; testa thin; endosperm abundant, oily.

Genus 1, species 3, Western and Eastern Cape.

Endlicher: 327 (1837); Candolle: 617 (1857); Bentham: 231 (1880), under Santalaceae; Hieronymus: 228 (1889); Hill: 135 (1915); Harms: 46 (1935) as Grubbiaceae; Fagerlind: 315 (1947); Carlquist: 115 (1977); Carlquist: 117 (1978); Dahlgren & Van Wyk: 25 (1988).

Grubbia P.J.Bergius 2121000

Bergius: 34 (1767); Endlicher: 327 (1837); Candolle: 617 (1857); Sonder: 325 (1862); Bentham: 231 (1880); Hieronymus: 230 (1889); Hill: 209 (1915); Harms: 49 (1935); Fagerlind: 315 (1947); Salter: 341 (1950); Carlquist: 115 (1977).

Ophira Burm.f. ex L.: 150 (1771); Steudel: 220 (1841).

Description as for family.

Species 3, southwestern districts of Western Cape to Uitenhage in Eastern Cape.

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Gunneraceae

(Rosidae—Haloragidales)

Compiled by C.L. Bredenkamp

Perennial herbs, nearly stemless, mainly rhizomatous, usually associated with water, monoecious or flowers bisexual. **Leaves** radical, alternate, simple, long-petioled, ovate- to orbicular-cordate, entire, lobed or crenate; stipules adhering to petioles. **Flowers** unisexual or bisexual, small, in compound spikes, sometimes with male flowers above and female below. **Calyx** 2- or 3-lobed, or sometimes 0, or imperfect in male flowers. **Petals** (0)2, small, concave. **Stamens** 1 or 2; anthers oblong, basifixed, longer than filaments. **Ovary** inferior, 1-locular, with a solitary, pendulous ovule; styles 2, papillose. **Fruit** a fleshy or leathery drupe, compressed, 3-angled or subglobose. $x = 17$ (12).

Genus 1, species 40, southern hemisphere; sthn Afr.: 1 genus, 1 species.

Harvey: 571 (1862) (Haloragcae); Mendes: 79 (1978) (Haloragaccae).

Gunnera L. 5836000

Linnaeus: 16, 121 (1767a); Linnaeus: 587, 597 (1767b); Schindler: 104 (1905); Mendes: 70 (1978).

Description as for family.

Central and South America, E and sthn Afr., Madagascar, Malaysia, Tasmania, New Zealand (9 species) and Hawaiian Islands (7 species); 1 in sthn Afr.: *Gunnera perpensa* L., widespread except in Namibia.

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Haloragaceae

(Rosidae—Haloragidales)

Compiled by C.L. Bredenkamp

Perennial herbs or undershrubs, rarely annuals, often monoecious, often associated with water. **Leaves** alternate, opposite, or whorled, simple or pectinato-pinnatifid; stipules sometimes present and adhering to petiole. **Flowers** unisexual or bisexual, often minute and imperfect, axillary, solitary, clustered, or sometimes in racemes, spikes, panicles, or corymbs. **Calyx** (0)2–4-lobed. **Petals** (0)2–4, free, concave, deciduous, usually valvate. **Stamens** (1)2–8; anthers 2-thecous, basifixed, ± oblong, often longer than filaments. **Ovary** inferior, 1–4-locular, compressed or 2–8-angled or -ribbed, sometimes 2–4-winged, with 1 or few pendulous ovules in each locule; styles 1–4, usually free, plumose or papillose. **Fruit** usually minute, nut-like or drupaceous, indehiscent, 1–3-locular, or of 2–4 cocci, with a single, pendulous seed in each locule or coccus.

Genera 9, species 120, cosmopolitan, but concentrated in Australia; sthn Afr.: genera 2, species 3.

Family name conserved.

Harvey: 571 (1862) (Halorageae); Obermeyer: 116 (1973); Mendes: 74 (1978).

Key to genera

Plants mainly in marshes, rooted in soil; leaves small, sessile ..... **Laurembergia**

Plants aquatic, floating; leaves in whorls or 3 or 4, with filiform segments ..... **Myriophyllum**

Laurembergia P.J.Bergius 5833000

Bergius 350 (1767); Obermeyer: 116 (1973).

Serpicula L.: 16 (1767); Harvey: 572 (1862).

Herbs, small, creeping and sometimes in marshy places, monoecious. **Leaves** opposite or alternate, entire or toothed. **Flowers** very small, in axillary fascicles. **Male flowers** long-pedicelled; calyx 4-lobed, tube short, lobes longer than tube; petals 4, linear-oblong, concave; stamens 4–8, as long as petals, anthers linear, subsessile; ovary 0; stigmas 4, rudimentary. **Female flowers** sessile or subsessile; calyx 4-lobed, tube short, ovoid, 8-ribbed, lobes ± as long as tube, deciduous; petals as in male flowers; stamens 0; ovary 1-locular with 1–4 pendulous ovules, styles 4, very short, feathery or hairy. **Fruit** a fleshy nut, 8-ribbed. **Seed** 1, cylindric.

Species 4, Africa to East Indies and New Zealand; 1 in sthn Afr.: *Laurembergia repens* P.J.Bergius subsp. *brachypoda* (Hiern) Oberm., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Northern, Western and Eastern Cape.

Myriophyllum L. 5834000

Linnaeus: 992 (1753); Harvey: 572 (1862); Mendes: 77 (1978).

Herbs, aquatic, monoecious or flowers sometimes bisexual. **Leaves** alternate, opposite, or whorled, entire to variously dissected and pectinate-pinnate. **Flowers** unisexual or bisexual, axillary, solitary, sessile or shortly pedicelled, or in a terminal spike with male flowers above and female below; bracts leafy; bracteoles 2, concave. **Male flowers**: calyx entire or 2–4-lobed, tube very short; petals 2–4, elliptic, concave; ovary 0; styles 4, rudimentary; stamens 2–8, exserted, filaments thread-like, anthers linear to linear-oblong. **Female flowers**: calyx entire or 4-lobed, tube sometimes furrowed; petals minute or 0; stamens 0 or rudimentary; ovary 2- or 4-locular, with a solitary, pendulous ovule in each locule, styles 4, short, thick and fleshy, often recurved, plumose or glandular-hairy. **Fruit** a nut or drupe or of 4 indehiscent carpels. $x = 7$ (9) (polyploidy).

Species 40, cosmopolitan; represented in Africa south of the Sahara by 2 species only, probably both introduced; sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Free State, KwaZulu-Natal, Northern, Western and Eastern Cape.

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Hamamelidaceae

(Hamamelidae—Hamamelidales)

Compiled by M. Jordaan

Evergreen or deciduous trees or shrubs, usually villous or with stellate indumentum. **Leaves** subopposite, opposite or alternate, simple, usually entire but sometimes ± toothed, elliptic or lanceolate, petiolate; stipules 2, small. **Inflorescences** dense, terminal or axillary heads or spikes. **Flowers** bisexual or some female, ± regular, yellow, greenish or white with red base. **Calyx**: tube shallow or campanulate, sometimes adnate to ovary; lobes 5(4), valvate. **Petals** 5(4), free, circinate or straight in bud, ± strap-shaped, with revolute margins, often 0 in female flowers. **Stamens** as many as and alternating with petals; filaments free, usually shorter than anthers; anthers 2-thecous, each theca opening with 1 valve, sometimes beaked; staminodes 0. **Ovary** from inferior to almost superior, of 2 carpels, 2-locular, usually pubescent; ovule solitary in each locule, pendulous, bitegmic, anatropous; placentation axile; styles 2, subulate. **Fruit** a subglobose capsule, 1- or 2-locular, 2-valved, but appearing 4-valved at apex after dehiscence, with ballistic seed ejection by bending, hard endocarp, tomentose. **Seeds** ellipsoid or ovoid-oblong, hilum divided into 2 areas extending from proximal end of seed on each side; embryo large, straight. $x = 12$ (1 report).

Genera ± 30, species ± 100, 12 genera monotypic, scattered and relictic distribution in the temperate and subtropical regions of both hemispheres, with greatest diversity in E Asia; only one genus in continental tropical Africa; sthn Afr.: genus 1, species 3.

Brown: 374 (1818), as Hamamelideae; Candolle: 267 (1830); Endlicher: 803 (1839); Hooker: 664 (1865); Reinsch: 347 (1890); Niedenzu: 115 (1891); Harms: 303 (1930); Endress: 371 (1989); Endress: 322 (1993).

Trichocladus Pers. 3311000

Persoon: 597 (1807); Candolle: 269 (1830); Endlicher: 804 (1840); Sonder: 324 (1862); Reinsch: 383 (1890); Harms: 322 (1930); Hutchinson: 427 (1933); Verdcourt: 1 (1971); Mendes & Vidigal: 71 (1978); Endress: 375 (1989); Endress: 327 (1993).

Description as for family.

Species ± 5; confined to eastern tropical and sthn Afr.; 3 in sthn Afr., Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape to Western Cape, near George.

Trichocladus belongs to subfamily Hamamelidoideae Reinsch (1890) tribe Hamamelideae A.DC. (1830) subtribe Dicoryphinae Endress (1989).

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Hernandiaceae

(Magnoliidae—Magnoliales)

Compiled by M. Jordaan

Deciduous trees, small to medium-sized, with branches leafy at apex, with aromatic oils and cystoliths in leaves and stems; plants monoecious or polygamous. **Leaves** alternate, simple, almost circular, entire or 3–5-lobate, with 3–5 major veins arising at or near base, whitish tomentose beneath, with long petioles; stipules 0. **Inflorescences** dichasial, ebracteate, in axils of upper leaves. **Flowers** bisexual or unisexual, mostly male, ± regular, epigynous, many, hairy, very small. **Perianth** of 4–8 ± free tepals, equal or unequal, 2 larger than the rest and accrescent in bisexual flowers, linear or oblong-spatulate, in a single whorl, imbricate, obtuse. **Stamens** usually 4 or 5, in a single whorl, much exserted, arising at base of perianth; filaments with dorsal appendages; anthers 2-thecous, broadly oblong, dehiscing laterally by 2 flap-like valves opening upwards. **Staminodes** as many as and alternating with stamens, or more numerous, ± clavate, ± glandular, partly connate, or with a single peltate staminode opposite style. **Ovary** inferior, 1-locular; ovule solitary, pendulous, anatropous, bitegmic and crassinucellar; style straight; stigma sessile, obliquely expanded. **Fruit** a bony nut, ovoid, apically provided with 2 terminal large spatulate wings formed by accrescent perianth segments. **Seed** broadly oblong, without endosperm; embryo straight. $x = 15$ (1 report).

Genera 5, species ± 60, mainly in lowland tropics of both the Old and New World, America, Africa and Asia, often coastal; sthn Afr.: genus 1, species 1.

Blume: 550 (1825) as Hernandieae; Dumortier: 14 (1829) as Gyrocarpeae; Meisner: 247 (1864) as Lauraceae tribus Gyrocarpeae; Pax: 126 (1889) as Hernandiaceae; Kubitzki: 78 (1969); Kubitzki: 334 (1993); Stannard: 59 (1997).

Gyrocarpus Jacq. 2830000

Jacquin: 282, t. 178, fig. 80 (1763); Brown: 404 (1810); Pax: 129 (1889); Sprague: 189 (1909); Schreiber: 1 (1968); Kubitzki: 180 (1969); Verdcourt: 6 (1985); Thulin: 20 (1993); Kubitzki: 337 (1993); Stannard: 60 (1997).

Description as for family.

Species 3 and 11 subspecies, widespread in tropical countries, 1 in Central America, 1 species with 2 varieties in NE and E Africa; 1 in sthn Afr.: *Gyrocarpus americanus* Jacq. subsp. *africanus* Kubitzki, Namibia and Northern Province.

Gyrocarpus Jacq. and *Sparattanthelium* Mart. sometimes separated as Gyrocarpaceae by e.g. Shutts (1960), but Kubitzki (1969, 1993) treats it as subfamily Gyrocarpoideae.

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Heteropyxidaceae

(Rosidae—Myrtales)

Compiled by J.E. Victor

Small trees or shrubs, aromatic, deciduous to semideciduous. **Leaves** alternate, simple, entire, petiolate; stipules rudimentary. **Inflorescence** a many-flowered, terminal panicle. **Flowers** usually unisexual by abortion, regular, small, perigynous with the hypanthium cyathiform; creamy yellow, scented, nectariferous. **Calyx** with (4)5 imbricate, persistent sepals. **Corolla** with (4)5 free, imbricate petals, arising on inner rim of hypanthium and alternating with calyx lobes, conspicuously gland-dotted, fugacious. **Disc** well developed and lining lower part of hypanthium, orange-brown. **Stamens** (4)5–8(–19), free, exserted, outer ones opposite petals; anthers 2-locular. **Female flowers** with (4)5–8(–10) staminodes. **Ovary** superior, globose, 2(3)-locular; ovules numerous on an axile placenta; style short, inserted in a depression of the ovary apex, persistent; stigma capitate. **Fruit** a small, loculicidal, 2(3)-valved capsule, partly included in persistent calyx, globose. **Seeds** numerous, minute, crescent-shaped and variously compressed, slightly winged, brownish.

Genus 1, species 3, south central and sthn Afr.; 3 species in sthn Afr.

Fernandes: 212 (1978); Dahlgren & Van Wyk: 35 (1988).

The family is sometimes included in Myrtaceae.

Heteropyxis Harv. 5588010

Harvey 2: 18, t. 128 (1863) name conserved, not of Griffith; Phillips: 492 (1951); Stern & Brizicky: 111 (1958); Fernandes: 207 (1971); Fernandes: 212 (1978); Tobe & Raven: 197 (1987); Dahlgren & Van Wyk: 35 (1988).

Description as for family.

Species 3, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland and KwaZulu-Natal.

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Hydnoraceae

(Magnoliidae—Aristolochiales)

Compiled by M. Jordaan

Holoparasitic, rootless, leafless, fungus-like plants, rich in tannins, with fleshy, terete or angular, warty, rhizome-like underground parts bearing series of vermiform outgrowths that connect to roots of host. **Flowers** bisexual, or func-

tionally unisexual, regular, large, solitary, buds developing underground, flowers usually emerging at least partly at anthesis. **Perianth**: tepals 3 or 4, united into a large fleshy cylindrical tube, often swollen at base; lobes valvate with apices free and spreading or connate at their tips to form 3 or 4 elliptic to round openings; inner surface flesh-coloured to yellow, outer surface cracked, brown; on inside of each lobe a white to dark brown bait body emitting a foetid smell. **Stamens** 3 or 4, alternating with tepals, arising at apex of tube; filaments absent; anthers very large, with many elongate fused thecae with longitudinal slits, together forming a lobed ring. **Ovary** inferior, 3- or 4(5)-carpellate, 1-locular; ovules many, orthotropous, tenuinucellate, unitegmic, pendulous from apical placenta; style absent; stigma of 3 or 4 broad, ridged lobes. **Fruit** an underground berry with thick leathery wall, baccate. **Seeds** numerous, globular or ovate, very small; testa hard, thick and embedded in a fleshy edible pulp which is rich in starch; embryo small, surrounded by endosperm and perisperm. $x = 8$ (1 report).

Genera 2; species ± 18; in Central and South America and arid parts of Africa, Saudi-Arabia, Réunion and Madagascar; sthn Afr.: genus 1, species 3.

Agardh: 31 (1858); Hooker: 108 (1873); Hooker: 116 (1880); Solms-Laubach: 283 (1889); Hill: 485 (1912) as Cytinaceae in part; Vaccaneo: 411 (1934); Harms: 282 (1935); Meijer: 341 (1993).

Hydnora Thunb. 2182000

Thunberg: 69, t. 2, figs. 1–3 (1775); Hooker: 108 (1873); Hooker: 120 (1880); Marloth: 465 (1907); Baker & Wright: 131 (1909); Hill: 486 (1912); Vaccaneo: 411 (1934); Harms: 288 (1935); Adamson: 344 (1950); Schreiber: 1 (1968); Visser: 64 (1981); Musselman: 22 (1984); Musselman & Visser: 77 (1987); Visser: t. 1992 (1989); Meijer: 343 (1993).

Description as for family.

Species ± 5, in arid regions of Africa, Réunion, Madagascar and Saudi Arabia; 3 in sthn Afr., Namibia, Botswana, Northern Province, Swaziland, KwaZulu-Natal, Northern, Western and Eastern Cape; parasitic on roots of *Euphorbia*, *Acacia* and *Albizia lebbeck*.

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Hydrophyllaceae

(Asteridae—Solanales)

Compiled by E. Retief

Annual or perennial herbs, usually hirsute or scabrid, sometimes densely bristly or spiny. **Leaves** alternate, rarely opposite, usually petiolate, toothed, or pinnately lobed, rarely entire; stipules 0. **Flowers** bisexual, regular, in bifid or dichotomous, scorpioid cymes, with flowers usually subsessile along one side of branches, or in simple spikes, or racemes, sometimes solitary. **Calyx** 5- or 10–12-lobed, sometimes appendiculate between lobes. **Corolla** funnel-shaped to campanulate or rotate, with 5 or 10–12 imbricate, rarely contorted lobes. **Stamens** as many as corolla lobes and alternating with them, usually arising on corolla tube near base, exserted or included; filaments sometimes dilated or appendiculate at base; anthers 2-thecous. **Disc** hypogynous, small or absent. **Ovary** superior, falsely 2-locular, due to 2 intruding parietal placentas, placentation then appearing axile; ovules 4–many; style 2-fid. **Fruit** a loculicidal, 2-valved capsule. **Seeds** 2–many; embryo straight, in oily endosperm.

Genera 22, species 275, subcosmopolitan (excluding Australia), especially in dry W and N America; sthn Afr.: genera 2, species 3.

Candolle: 287 (1845); Bentham: 825 (1876); Baker: 1 (1906); Brand: 1 (1913); Phillips: 624 (1951); Friedrich-Holzhammer: 1 (1967); Tutin: 83 (1972); Verdcourt: 57 (1990).

Key to genera

Flowers 5-merous ..... ***Phacelia**

Flowers 8–12-merous; plants densely white-aculeate ..... **Codon**

Codon L. 7032000

Linnaeus: 292 (1767); Wright: 1 (1904); Baker: 1 (1906); Brand: 172 (1913); Phillips: 625 (1951); Friedrich-Holzhammer: 1 (1967).

Erect herbs, sometimes woody at base, covered with straight, white to yellowish spines up to 10 mm long and with dense, short bristles and glandular hairs. **Leaves** alternate, ovate or ovate-lanceolate, with margin entire or sinuate-dentate. **Flowers** in terminal helicoid cymes or solitary; pedicel short. **Calyx** with 10–12 lobes only fused at base; lobes linear, alternate ones nearly as long as corolla, others shorter, sometimes pustulate. **Corolla** 10–12-lobed, yellow or white, often with red stripes on outside; tube broadly campanulate or oblong in outline, sometimes gibbous at base, sometimes produced into

plates at base inside, with filaments arising on edge of plates; lobes shorter than tube, oblong or ovate-elliptic, sometimes pustulate outside, imbricate. **Stamens** 10–12, attached to base of corolla and sometimes slightly exceeding it; filaments semiterete, hirsute below middle, with oblong, versatile anthers. **Ovary** narrowed at apex, falsely 2-locular by intrusion of placentas, sometimes pustulate, with many ovules; ovules pyriform; style almost as long as corolla, linear, cleft to almost halfway, with simple stigmas. **Fruit** a 2-valved capsule, with valves bearing placentas on their centres. **Seeds** many, globose or irregularly angled, rugose. $x = 17$.

Species 2, endemic in sthn Afr.: *Codon royenii* L. and *Codon schenckii* Schinz, Namibia, Northern and Western Cape (north-west region).

*Phacelia Juss. 7025000

Jussieu: 129 (1789); Brand: 60 (1913); Tutin: 83 (1972).

Annual, rarely perennial herbs. **Leaves** alternate or the lowermost opposite, deeply pinnately lobed to irregularly pinnate, rarely entire. **Flowers** in scorpioid inflorescences, shortly pedicellate. **Calyx** deeply 5-lobed almost to base; without appendages between lobes. **Corolla** 5-lobed, rotate to campanulate, white; lobes nearly as long as tube. **Stamens** 5; filaments with appendages at their base. **Ovary** 1-locular with 2 intruding placentas looking like a septum, hairy, with 4 or more ovules; style bifid. **Fruit** a capsule. **Seeds** usually 4 or more. $x = 11$ (12, 9) (aneuploids, polyploidy).

Species 150, mostly from W North America; 1 in sthn Afr.: **Phacelia artemisioides* Griseb., from Argentina, occurs as a roadside weed in the Venterstad-Bethulie area of the Free State and the northern part of the Eastern Cape.

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Hydrostachyaceae

(Asteridae—Callitrichales)

Compiled by R.P. Glen

Submerged, fern-like, annual or rarely perennial herbs found on rocks in fast-flowing freshwater, dioecious or rarely monoecious; rhizome discoid or tuberous, forming a compact circle of roots, firmly attached to rocks. **Leaves** basal, 2- or 3-pinnatifid, petiolate, dilated and ligulate at base, petiole and rachis densely covered with warty tongue-shaped protuberances; pinnae dissected into multifid, variously-shaped outgrowths ('gill-tufts'). **Inflorescence** emergent, densely spicate (resembling fruiting spikes of *Plantago major*); scape verrucose or rarely smooth. **Flowers** unisexual, small, sessile, solitary in axils of spirally arranged, closely imbricate bracts; calyx and corolla 0. **Male flowers** consisting of one sessile or subsessile stamen with 2 oblong thecae; pollen in tetrads, copious. **Female flowers**: ovary superior, of 2 fused carpels, 1-locular, many-ovuled, with 2 parietal placentas; styles 2, exserted from the bracts, persistent. **Fruit** a 2-valved capsule, enclosed in persistent bract. **Seeds** small, light, many; endosperm 0.

Genus 1, species 22, Africa south of the equator and Madagascar; sthn Afr.: species 1.

Podlech: 1 (1966); Obermeyer: 211 (1970); Cusset: 75 (1973); Cook: 105 (1990); Scogin 471 (1992); Stannard 10 (1997).

In habit the family closely resembles Podostemaceae, and the two were formerly often considered to be affiliated. Recently Hydrostachyaceae has been placed in or near Scrophulariales, Lamiales or Plantaginales. Chemical data support affiliations with Bruniales.

Hydrostachys Thouars 3160000

Thouars: 2 (1806); Obermeyer: 211 (1970); Cusset: 75 (1973); Cook: 105 (1990); Stannard 10 (1997).

Description as for family.

Species 22; 1 in sthn Afr.: *Hydrostachys polymorpha* Klotzsch, a fragmentary distribution, in rapids in the Kunene River in Namibia and in the Umgeni and Umkomaas Rivers in KwaZulu-Natal.

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Icacinaceae

(Rosidae—Icacinales)

Compiled by R.H. Archer

Trees or shrubs, sometimes scandent, or lianas, sometimes spinescent. **Leaves** alternate or opposite, simple; stipules 0. **Flowers** regular, bisexual or unisexual by abortion, sometimes with a single perianth whorl. **Calyx** (3)4- or 5-

toothed or -lobed (*Pyrenacantha*). **Petals** as many as sepals, free or united at base, imbricate or valvate. **Stamens** as many as petals and alternating with them; filaments free or connate, sometimes hairy; anthers 2-thecous with longitudinal slits. **Ovary** superior, 1-locular, with 2 pendulous ovules in each locule; style simple or 0; stigma small or consisting of a number of radiating tubes. **Fruit** a drupe. **Seeds** usually solitary, pendulous, compressed, ovate-reniform; embryo usually small, ± straight; endosperm oily, usually copious.

Genera ± 53; species ± 400, predominantly tropical forest; sthn Afr.: genera 3, species 8.

Mendes: 340 (1963); Potgieter: 1 (1994).

Key to genera

1a Leaves opposite; inflorescences dichotomous ..... **Cassinopsis**

1b Leaves alternate; inflorescences various:

2a Trees or shrubs; calyx and corolla present; flowers bisexual, in terminal panicles; style filiform..... **Apodytes**

2b Lianas with twining stems; calyx absent; flowers unisexual; stigma sessile; endocarp spiny on inner face ..... **Pyrenacantha**

Apodytes E.Mey. ex Arn. 4686000

Arnott:155 (1840); Sonder: 235 (1860a) under Olacineae; Mendes: 343 (1963); Van Wyk & Potgieter: 231 (1994).

Shrubs or trees. **Leaves** alternate, simple, petiolate, often shiny. **Flowers** small, in terminal or axillary cymes, corymbs, or panicles. **Calyx** saucer-shaped, small, minutely 5-toothed. **Petals** 5, free or united into a basal tube; lobes valvate. **Stamens** 5, slightly cohering at base with petals or corolla tube. **Ovary** 1-locular, with 2 pendulous ovules; style terete, excentric or oblique, often ± incurved; stigma small. **Fruit** a drupe, obliquely ellipsoid or orbicular, compressed with large, lateral, fleshy appendage, often with remains of style on one side of base; embryo apically in seed; endosperm fleshy. $x = 12$.

Species 5–17 (depending on species concept), Africa, Madagascar, and Australasia; 3 in eastern and southern parts of sthn Afr.

Cassinopsis Sond. 4671000

Sonder: 473 (1860b) under Aquifoliaceae; Mendes: 341 (1963).

Tall shrubs or small trees, glabrous, often spinescent. **Leaves** opposite, elliptic to ovate, sometimes toothed. **Flowers** small, bisexual, in axillary, dichotomously branched panicles, alternating from node to node. **Calyx** 5-lobed or -segmented. **Petals** 5, usually free, longer than calyx, imbricate, white. **Stamens** 5, alternating with petals; filaments subterete. **Disc** absent. **Ovary** sessile, pubescent, 1-locular, with 2 pendulous ovules; style sometimes sublateral, simple or obscurely lobed. **Fruit** a nearly dry, subglobose or ovoid drupe with a woody endocarp. **Seed** solitary, endosperm copious.

Species 6, Africa and Madagascar; 2 in forest areas of sthn Afr.

Pyrenacantha Wight 4709000

Wight: 107 (1830); Mendes: 347 (1963).

Lianas or scandent shrubs, dioecious or monoecious. **Leaves** alternate, petiolate, with entire to lobed margin. **Flowers** (3)4(5)-parted, valvate. **Male flowers** in slender spikes; stamens (3)4(5), shorter than perianth; filaments linear, about as long as anthers; anthers linear; ovary rudimentary. **Female flowers** in short, few-flowered spikes; stamens absent; ovary globose, 1-locular, with 2 ovules, villous; stigma sessile, of a number of radiating tubes. **Fruit** a drupe; endocarp crustaceous, verrucose-papillose inside, papillae projecting into interstices of deeply ruminate and pitted endosperm; embryo with thin foliaceous cotyledons in centre of copious fleshy endosperm. $x = 10$ (1 report).

Species 25–30, Africa, Madagascar, Indochina and Malesia; 3 in eastern and southern parts of sthn Afr.

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Kirkiaceae

(Rosidae—Sapindales)

Compiled by R.H. Archer

Trees, deciduous; monoecious; branches with prominent leaf scars. **Leaves** alternate (spiral), tufted at ends of branchlets, imparipinnate, with many opposite leaflets, usually with crenate margins; stipules 0. **Inflorescence** axillary, of paniculate cymes. **Flowers** usually unisexual, regular; flowers of only one sex open on a tree at a time. **Calyx** of 4 free sepals. **Petals** 4, free, imbricate, usually glandular at base within. **Disc** fleshy, annular or swollen. **Stamens** 4, alternating with petals, and arising on outside of disc; staminodes present in female flowers. **Ovary** superior, 4-locular, 4-lobed, with solitary ovule in each locule; placentas axile; reduced in male flowers; style slender, with capitate stigma formed of 4 fused styles, caducous about middle with age and simulating 4 free, short styles, absent in male flowers. **Fruit** dry, sharply 4-angled, at length separating into 4 or 8 1-seeded cocci, triquetrous, suspended from top of a central carpophore. **Seeds** slender, triangular in cross section; endosperm ± 0.

Genera 2, species 4, tropical and sthn Afr.; one monotypic genus, *Pleiokirkia* Capuron in Madagascar; sthn Afr.: genus 1, species 3.

Stannard: 829 (1981); Fernando *et al.*: 102 (1995).

Formerly usually included in Simaroubaceae. The proposed family status of Kirkiaceae near the Simaroubaceae (Takhtajan 1997) appears justified in the light of *rbc*L sequence data (Fernando *et al.* 1995).

Kirkia Oliv. 4128000

Oliver: 311 (1868); Wild & Phipps: 40 (1963); Stannard: 829 (1981); Immelman: 1 (1986).

Description as for family.

Species 5 in Africa, 3 in sthn Afr., Namibia, Northern Province and Mpumalanga.

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Lamiaceae (Labiatae)

(Asteridae—Lamiales)

Compiled by E. Retief

Herbs, mainly perennial, shrubs or trees, often aromatic; branches usually 4-angled. **Leaves** opposite or whorled, simple, rarely pinnately lobed (*Teucrium*) or digitately compound (*Cedronella*, *Vitex*), entire or toothed; usually gland-dotted and aromatic; stipules 0. **Flowers** irregular to regular, bisexual or rarely unisexual (*Tetradenia*), solitary and opposite or aggregated into cymes or verticils arranged in terminal, spike-like compound inflorescences found on main or sometimes lateral branches; bracts present, leaf-like or reduced, often caducous. **Calyx** of 5 fused sepals, tubular, campanulate to spreading, usually persistent and often enlarged in fruit, rarely becoming fleshy (*Hoslundia*), regularly or irregularly 3–many-toothed, or with 2 entire or toothed lips, rarely truncate or 5-partite, sometimes with posterior lobe broadly ovate and decurrent on tube. **Corolla** of 5 ± fused petals, (1)2-labiate or ± regular and 4- or 5-lobed. **Stamens** (2)4, subequal or in pairs of unequal length (didynamous), all or only 1 pair fertile, arising at corolla mouth or in tube; filaments sometimes connate, sometimes with a crest or projection near base; anthers 1- or 2-thecous, with longitudinal slits. **Ovary** superior, seated on an entire or lobed disc, deeply or shortly 4-lobed, 4-locular, with a single ovule in each locule; ovules lateral on false septa; style gynobasic or terminal; stigma usually inconspicuous at tips of 2 stylar branches or lobes or entire. **Fruit** composed of 4, or by abortion fewer, dry, 1-seeded nutlets; nutlets rugose or smooth, rarely winged (*Tinnea*); or fruit a drupe with 1–4 pyrenes. **Seeds** with embryo straight and little or no endosperm.

Genera 252, species 6700; cosmopolitan in warm and temperate areas; 37 genera and 235 species are indigenous or naturalised in sthn Afr., occurring mainly in eastern parts of region; many species have links with tropical Africa and may be regarded as peripheral tropical taxa.

Jussieu: 110 (1789) as Labiatae; Bentham: 25 (1848) as Labiatae; Bentham: 1160 (1876) as Labiatae; Briquet: 183 (1895–1897) as Labiatae; Baker: 332 (1900) as Labiatae; Brown *et al.*: 226 (1910) as Labiatae; Launert & Schreiber: 1 (1969); Codd: 1 (1985); Zomlefer: 265 (1994); Hedge *et al.*: 1 (1998).

The treatment of the Lamiaceae is based on the account of Codd (1985). Four genera, namely *Clerodendrum*, *Karomia*, *Premna* and *Vitex*, were moved from the Verbenaceae to the Lamiaceae according to Cantino (1992).

Classification of Lamiaceae

I. Subfamily VITICOIDEAE: *Premna*, *Vitex*
II. Subfamily TEUCRIOIDEAE: *Clerodendrum*, *Karomia*, *Teucrium*
III. Subfamily AJUGOIDEAE: *Ajuga*
IV. Subfamily SCUTELLARIOIDEAE: **Scutellaria*, *Tinnea*
V. Subfamily LAMIOIDEAE: *Acrotome*, *Ballota*, **Lamium*, *Leonotis*, *Leucas*, **Marrubium*, *Stachys*
VI. Subfamily NEPETOIDEAE
  1. Tribe **Mentheae**: **Cedronella*, *Mentha*, **Prunella*, *Salvia*, *Satureja*, *Tetradenia*
  2. Tribe **Ocimeae**:
    a) Subtribe **Hyptidinae**: **Hyptis*
    b) Subtribe **Ociminae**: *Acrocephalus*, *Basilicum*, *Becium*, *Endostemon*, *Geniosporum*, *Hemizygia*, *Ocimum*, *Orthosiphon*, *Syncolostemon*, *Thorncroftia*
    c) Subtribe **Plectranthinae**: *Aeollanthus*, *Englerastrum*, *Holostylon*, *Hoslundia*, *Neohyptis*, *Plectranthus*, *Pycnostachys*, *Rabdosiella*, *Solenostemon*

Key to genera

1a Fruit dry and hard, turbinate, flat above, with 4 small horns in a cross, at length dividing into 4 pyrenes; calyx accrescent to form a plate-like structure in fruit ..... **Karomia**
1b Fruit a drupe or nutlet; calyx sometimes accrescent in fruit:
  2a Fruit a drupe:
    3a Leaves palmately compound with (1–)3–5 leaflets ..... **Vitex**
    3b Leaves simple:
      4a Fruit an entire drupe containing a single, 4-locular pyrene ..... **Premna**
      4b Fruit a 4-lobed or -furrowed drupe with 4 pyrenes ..... **Clerodendrum**
  2b Fruit composed of 4 (or by abortion fewer) nutlets:

5a Corolla 1-lipped or very unequally 2-lipped, with the upper lip small or absent; ovary shortly 4-lobed or lobed to the middle; nutlets reticulate with oblique or lateral areole occupying half to three-quarters of the length:
6a Calyx 2-lipped, inflated in fruit, lips entire; stamens not or scarcely exserted; nutlets winged ..... **Tinnea**
6b Calyx subequally 5-toothed; stamens exserted, ascending; nutlets not winged
7a Inflorescence a spike-like raceme arising from a basal rosette of leaves; flowers in 2–many-flowered verticils, bluish ..... **Ajuga**
7b Inflorescence racemose or paniculate with no basal rosette of leaves; flowers small, white, in 1–several-flowered pedunculate cymes ..... **Teucrium**
5b Corolla 2-lipped or nearly regularly lobed; ovary deeply 4-lobed; nutlets smooth with small basal or slightly oblique areole:
8a Stamens ascending or spreading, never all directed downwards upon lower side of tube or lower lip of the corolla (absent in female flowers of *Tetradenia*)
9a Fertile stamens 2, anther thecae separated by a long connective; calyx 2-lipped ..... **Salvia**
9b Fertile stamens 4; calyx 2-lipped or 5–many-toothed:
10a Stamens spreading, filaments straight, with 2 directed upwards and 2 downwards (absent in female flowers of *Tetradenia*); corolla small, 2–5 mm long, subequally 4- or 5-lobed:
11a Perennial rhizomatous herbs, monoecious ..... **Mentha**
11b Semisucculent or softly woody shrubs, usually flowering after leaves are shed, dioecious ..... **Tetradenia**
10b Stamens all directed to upper side of tube or upper lip of corolla; corolla 5 mm long or longer (sometimes shorter in *Scutellaria*, but then calyx distinctly 2-lipped with upper lip deciduous):
12a Calyx 2-lipped; perennial decumbent herbs:
13a Calyx lips rounded, entire, upper lip deciduous; inflorescence of lax, 2-flowered verticils; corolla 4.5–6.0 mm long ..... ***Scutellaria**
13b Calyx lips toothed, upper broad with 3 short teeth, lower of 2 longer narrow teeth; inflorescence shortly spicate of densely placed 4–6-flowered verticils; corolla 9–10 mm long ..... ***Prunella**
12b Calyx regularly or irregularly 5–many-toothed, mouth sometimes oblique but not distinctly 2-lipped (obscurely 2-lipped in some *Leucas* species but calyx 6–10-toothed):
14a Leaves 3(–5)-foliolate ..... ***Cedronella**
14b Leaves simple:
15a Corolla usually orange or yellow, rarely cream; upper lobe 12–30 mm long; calyx 8–10-toothed.. **Leonotis**
15b Corolla not orange or yellow; upper lobe shorter than 10 mm:
16a Stamens included in corolla tube:
17a Anthers and style held together by intermingling hairs; calyx glabrous within; teeth not hooked at apex ..... **Acrotome**
17b Anthers and style not held together by intermingling hairs; calyx hairy within, teeth hooked at apex ..... ***Marrubium**
16b Stamens reaching mouth of corolla tube or exserted (stamens included in cleistogamous flowers of *Lamium amplexicaule* but then bracts amplexicaul):
18a Calyx 6–many-toothed (teeth often very unequal in size):
19a Calyx glabrous within, 6–10-toothed, often oblique at mouth but limb not spreading..... **Leucas**
19b Calyx hairy within, 10- or more toothed, limb eventually spreading ..... **Ballota**
18b Calyx subequally 5-toothed:
20a Calyx 5–10-ribbed; stamens arising within corolla and usually well exserted:
21a Bracts large, amplexicaul (in naturalised species); upper corolla lip longer than the lower; lower corolla lip with lateral lobes absent or reduced to small acute teeth ..... ***Lamium**
21b Bracts leaf-like or reduced, not amplexicaul; corolla lips subequal or lower lip the longer and with distinct ± obtuse lateral lobes:
22a Bracts leaf-like; calyx often with additional smaller teeth (5–8-toothed); upper lip of corolla subequal to lower and beset with stiff, brush-like hairs ..... **Leucas**
22b Bracts usually reduced, occasionally leaf-like; calyx always 5-toothed; upper lip of corolla glabrous or pubescent but not with stiff, brush-like hairs, usually shorter than horizontal lower lip ..... **Stachys**
20b Calyx 13(–15)-ribbed; stamens arising near corolla throat with very short upcurved filaments ..... **Satureja**
8b Stamens directed downwards upon the lower side of the corolla tube or lower lip of the corolla:
23a Calyx enlarged and fleshy in fruit; upper pair of stamens reduced to staminodes ..... **Hoslundia**
23b Calyx somewhat enlarged but not fleshy in fruit; all 4 stamens fertile (upper pair reduced to staminodes in *Plectranthus zuluensis*):
24a Calyx falling away by a clean break above base in fruit ..... **Aeollanthus**
24b Calyx persistent in fruit, 3–5-toothed or bilabiate:
25a Corolla with 4 subequal or slightly unequal lobes, not distinctly 2-lipped; stamens included in corolla tube ..... **Endostemon**
25b Corolla either distinctly 2-lipped or 5-lobed; stamens exserted:
26a Calyx with 5 equal, rigid, spine-like teeth; flowers in a dense, terminal, spike-like inflorescence..... **Pycnostachys**
26b Calyx not rigidly spinescent:
27a Calyx equally or subequally 5-toothed, uppermost tooth sometimes slightly larger than other 4:
28a Bracteoles linear, setose; calyx teeth linear-subulate; corolla small, ± equally 5-lobed..... ***Hyptis**

28b Bracteoles absent or not as above; calyx teeth not linear-subulate; corolla bilabiate:
29a Lower pair of stamens united for most of their length, upper pair arising in corolla tube, free..... **Syncolostemon**
29b Lower and upper pairs of stamens arising at corolla throat, free or all shortly united at base:
30a Bracts differentiated from and smaller than leaves:
31a Style bilobed; inflorescence paniculate or subspicate with flowers in verticils of 3–many-flowered cymes or dichasia..... **Plectranthus**
31b Style with entire stigma; inflorescence paniculate with slender branches somewhat zigzag towards ends and bearing solitary flowers..... **Holostylon**
30b Bracts leaf-like, becoming gradually smaller towards apex of inflorescence or towards ends of flower-bearing stems:
32a Stems semiwoody, erect; inflorescence dense, paniculate or spicate:
33a Flowers in 6–8-flowered verticils, densely arranged in short lateral and terminal spikes.. **Neohyptis**
33b Flowers in dichasia arranged in a terminal panicle..... **Rabdosiella**
32b Stems softly herbaceous, decumbent or erect; flowers in slender, lax, axillary racemes borne along almost entire length of stem..... **Englerastrum**
27b Calyx bilabiate:
34a Upper lip of calyx 3-toothed (teeth sometimes minute), lower lip 2-toothed or entire:
35a Inflorescence corymbose, flower-heads capitate, 8–10 mm long and almost equally broad..... **Acrocephalus**
35b Inflorescence spike-like, 50–100 mm long; flowers in dense many-flowered cymose clusters..... **Geniosporum**
34b Upper lip of calyx consisting of a large, oblong to broadly ovate tooth, often decurrent on tube, distinctly larger than remaining teeth:
36a Upper pair of filaments glabrous or pubescent but without a crested or hairy knee-bend near base:
37a Lower 2 calyx teeth fused for the greater part forming an oblong bifurcate lip; lateral teeth much shorter and rounded..... **Solenostemon**
37b Lower 4 calyx teeth subequal, lanceolate-deltoid, lower 2 often longer than lateral 2 and shortly fused at base:
38a Filaments of lower pair of stamens connate for part of their length; upper pair attached to corolla tube and free..... **Hemizygia**
38b Filaments all free or all connate at base:
39a Corolla about 2 mm long, obscurely bilabiate; lower lip almost flat..... **Basilicum**
39b Corolla 4 mm long or longer, bilabiate; lower lip concave to boat-shaped:
40a Corolla with upper lip having 2 ear-like lobes; flowers in 1–many-flowered verticils or cymes, never all solitary:
41a Upper calyx tooth not decurrent on tube; filaments arising at mouth of corolla tube; mostly herbaceous plants..... **Plectranthus**
41b Upper calyx tooth decurrent on tube; upper pair of filaments arising within corolla tube; woody plants..... **Orthosiphon**
40b Corolla with 2 narrow pendulous lobes on each side of and free from upper lip; flowers solitary in axils of somewhat leafy bracts..... **Thorncroftia**
36b Upper pair of filaments with a crested or hairy knee-bend near base:
42a Lower pair of calyx teeth fused or free but not ending in a small pair of upcurved spinescent teeth; lateral teeth small, deltoid-subulate..... **Ocimum**
42b Lower pair of calyx teeth fused into a lip ending in a small pair of upcurved spinescent teeth; lateral teeth suppressed and replaced by a wide shoulder-like and occasionally fimbriate sinus..... **Becium**

Acrocephalus Benth. 7362000

Bentham: t. 1282 (1829); Bentham: 23 (1832); Bentham: 47 (1848); Bentham: 1173 (1876); Briquet: 365 (1897); Baker: 354 (1900); Launert & Schreiber: 4 (1969); Codd: 213 (1985).

Haumaniastrum P.A.Duvign. & Plancke: 222 (1959).

Perennial herbs or shrubs. **Leaves** sometimes in basal rosettes, usually narrow, entire to obscurely toothed. **Inflorescences** capitate, usually corymbose, subtended by coloured leafy bracts; floral bracts small. **Calyx** bilabiate, compressed; tube subcylindric, often arcuate; upper lip shortly 3-toothed or entire; lower lip shortly 2-toothed or entire. **Corolla** bilabiate, slightly longer than calyx; tube short; upper lip shortly 4-lobed; lower lip entire, flat. **Stamens** 4, didynamous, declinate, scarcely exserted; lower pair arising near throat, upper pair about middle of corolla; anthers 1-thecous. **Style** shortly bilobed. **Nutlets** ovoid or oblong, smooth. $x = 14$ (9 – 1 report) (polyploidy).

Species 130, in tropical regions of the Old World; 1 species: *Acrocephalus sericeus* Briq., is recorded from NE Namibia including the Caprivi.

Acrotome Benth. ex Endl. 7236000

Endlicher: 627 (1838); Bentham: 1206 (1876); Briquet: 229 (1896); Baker: 471 (1900); Skan: 334 (1910); Launert & Schreiber: 5 (1969); Codd: 19 (1985).

Annual or perennial herbs or subshrubs. **Leaves** entire or toothed. **Inflorescences** terminal, of spaced few- or densely many-flowered, often glomerate verticils; bracts leaf-like, becoming smaller towards apex of inflorescence; bracteoles linear, often bristle-like and spine-tipped, arcuate and often conspicuous at base of verticil. **Calyx** as long as or shorter than corolla tube, tubular-campanulate, 10- or 11-nerved, slightly oblique or symmetrical at mouth, equally or unequally 5–11-toothed. **Corolla** 2-lipped; tube slightly exceeding calyx, tubular,

often with a ring of hairs or glands within ± the middle, pubescent without; upper lip ascending or slightly arched, almost flat, without a fringe of hairs; lower lip spreading, 3-lobed, with middle lobe the largest. **Stamens** 4, didymous, arising ± at same level near middle of corolla tube, included within tube, held together by intertwining hairs; filaments of posterior pair ± straight, those of anterior pair recurved; anthers obovoid or oblong, 1-thecous by confluence, bearing a glandular crest. **Ovary** 4-lobed, truncate and glandular on truncate surface; style hairy, included with anthers, entire, oblique at apex. **Nutlets** obovoid, triquetrous, truncate at apex.

Species ± 8, Africa; 6 widespread in sthn Afr., absent from Western Cape.

Aeollanthus Mart. ex Spreng. 7345000

Sprengel: 678 (1825); Launert & Schreiber: 7 (1969); Codd: 121 (1985).

Annual or perennial herbs or subshrubs; stems and leaves often fleshy. **Leaves** subentire. **Inflorescences** usually terminal, paniculate; flowers small, placed singly or in pairs in lax or dense spikes or racemes; bracts small. **Calyx** small and shortly 5-toothed at flowering, elongate and often becoming truncate at maturity, eventually circumscissile near base. **Corolla** bilabiate; tube narrowly cylindrical at base, widening upwards, straight or curved; upper lip obscurely 4-lobed, lower lip larger, concave, entire or toothed near apex. **Stamens** didynamous, arising in corolla mouth, declinate, usually lying in lower corolla lip; filaments free; anthers confluent, 1-thecous. **Style** shortly 2-fid, exserted beyond stamens. **Nutlets** orbicular or ovoid, flattened, smooth. x = 9 (17) (1 report each).

Species 43, in tropical and warm regions of Africa; 6 species found in northern parts of Namibia and Botswana and eastern regions of sthn Afr.: Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Ajuga L. 7211000

Linnaeus: 561 (1753); Linnaeus: 246 (1754); Bentham: 597 (1848); Briquet: 209 (1895); Baker: 501 (1900); Skan: 386 (1910); Codd: 7 (1985).

Perennial herbs, often decumbent or stoloniferous. **Leaves** mostly in a basal rosette, usually coarsely toothed to incised. **Inflorescences** terminal, spike-like, verticillate; verticils 2–many-flowered; bracts leaf-like, becoming smaller towards apex. **Calyx** short, subequally 5-fid or 5-toothed; tube campanulate. **Corolla** unequally 2-lipped; tube short, constricted near base with a ring of hairs within constriction; upper lip short, subentire, emarginate or 2-fid; lower lip large, spreading, 3-lobed, median lobe the largest, emarginate or 2-fid. **Stamens** 4, curved within upper lip, lower pair slightly longer; filaments linear; anthers 2-thecous, with thecae divergent, finally confluent. **Ovary** shortly 4-lobed nearly to middle; style 2-fid, lobes somewhat unequal. **Nutlets** obovoid, reticulate-rugose, attached by a broad oblique areole which extends beyond middle. x = 8 (7) (aneuploids, high polyploidy, B-chromosomes—1 report).

Species 50, mainly in temperate areas of the Old World; 1 in sthn Afr.: *Ajuga ophrydis* Burch. ex Benth. in eastern parts of region: Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho and Eastern Cape.

Ballota L. 7279000

Linnaeus: 582 (1753); Linnaeus: 253 (1754); Bentham: 592 (1834); Bentham: 517 (1848); Bentham: 1212 (1876); Briquet: 259 (1896); Baker: 472 (1900); Skan: 368 (1910); Patzak: 149 (1972); Codd: 49 (1985).

Perennial herbs or small shrubs, markedly pubescent. **Leaves** often rugose, toothed. **Inflorescences** usually simple, of several to many verticils; verticils few- to many-flowered; bracts similar to leaves; bracteoles linear to spathulate, ascending, often somewhat spine-tipped or subulate. **Calyx** funnel-shaped, 10-nerved, 10–20-toothed, villous, glandular; teeth subequal or unequal, spreading, ovate-deltoid, shortly acuminate or narrowed into an awn. **Corolla** bilabiate; tube shorter than or equalling calyx, with a ring of hairs in throat; lower lip 3-lobed with median lobe the largest, emarginate. **Stamens** 4, didynamous, ascending, anterior pair longer and shortly exserted; filaments arising near throat, villous; anthers 2-thecous, thecae diverging. **Style** subequally 2-lobed, shortly exserted. **Nutlets** ovoid-oblong, rounded at apex, smooth. x = 11 (7, 9, 10) (polyploidy).

Species ± 35, concentrated around the Mediterranean and adjoining Asia Minor; 1 species: *Ballota africana* (L.) Benth. in arid parts of the winter-rainfall region as far north as the Orange River and S Namibia, also in Free State and Eastern Cape.

Basilicum Moench 7364000

Moench: 143 (1802); Morton: 238 (1962); Codd: 217 (1985).

Moschosma Rchb.: 171 (1828).

Annual, erect aromatic herbs. **Leaves** membranous, entire to dentate. **Inflorescences** terminal on slender main and lateral branches, spike-like; flowers shortly pedicellate, in usually 2–6-flowered verticils; bracts much smaller than leaves, persistent. **Calyx** bilabiate, somewhat declinate, accrescent; tube campanulate, 5-toothed; upper tooth the largest, ovate, slightly decurrent, two lateral teeth lanceolate, subulate. **Corolla** small, obscurely bilabiate; tube short; upper lip short and broad, 4-lobed; lower lip oblong, nearly flat, entire. **Stamens** 4, didynamous, declinate; filaments not kneed or crested near base; anthers 1-thecous. **Disc** saucer-shaped. **Ovary** glabrous; style shortly exserted; stigma bifid. **Nutlets** ovoid, somewhat compressed, smooth, pale brown. x = 7 (1 report) (polyploidy).

Species 7, in tropical regions of the Old World; 1 species: *Basilicum polystachyon* (L.) Moench is recorded from the eastern lowveld of Mpumalanga, Swaziland and N KwaZulu-Natal.

Becium Lindl. 7366010

Lindley: 42 (1842); Brown: 230 (1910); Launert & Schreiber: 9 (1969); Codd: 223 (1985); Paton: 199 (1995).

Ocimum in sense of Benth.: 1 (1832) in part. *Ocimum* sect. *Hiantia* Benth.: 35 (1848).

Perennial herbs or shrublets. **Leaves** opposite or whorled, often very small, entire to toothed. **Inflorescences** terminal, spike-like, on main and upper lateral branches; verticils spaced or crowded; bracts present as an apical coma in bud stage, early deciduous often leaving a conspicuous circular gland-like scar; verticils usually 6-flowered. **Calyx** bilabiate; tube campanulate; upper lip broadly ovate, decurrent on tube; lateral pair of teeth obsolete but replaced by a wide shoulder-like sinus often with a fimbriate margin; lowest pair of teeth subulate or bristle-like. **Corolla** bilabiate; tube exceeding calyx, expanding towards mouth; upper lip erect, 4-lobed; lower lip spreading, entire, concave. **Stamens** 4, subequal, well exserted, declinate; filaments free, upper pair arising near base of corolla tube with a hairy knee-bend near base, lower pair arising near throat. **Disc** cup-shaped. **Ovary** glabrous; style well exserted, deeply 2-lobed. **Nutlets** ellipsoid or oblong, somewhat compressed. x = 12 (1 report) (polyploidy).

Species ± 33, in tropical Africa, extending into the Arabian Peninsula and India; 4 in sthn Afr., N and NE Namibia, Botswana, Northern

Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal and Eastern Cape.

*Cedronella Moench 7245000

Moench: 411 (1794); Bentham: 405 (1848); Bentham: 1200 (1876); Briquet: 235 (1896); Skan: 333 (1910); Codd: 27 (1985).

Perennial herbs, woody at base. **Leaves** digitately 3(–5)-foliolate, thin-textured, toothed. **Inflorescences** dense, of many crowded verticils, lowest verticil often a distance below the rest; verticils densely many-flowered, made up of opposite, much-branched cymes, lower cymes pedunculate; bracts narrow, simple or 3-foliolate; bracteoles linear-filiform. **Calyx** tubular-campanulate, 13–15-nerved, equally 5-toothed; teeth narrowly lanceolate-deltoid, subulate, erect. **Corolla** tube exserted, somewhat widened at throat, glabrous within; upper lip erect, somewhat hooded, 2-fid or emarginate, ± equal in length to the lower; lower lip spreading, 3-fid with median lobe the largest. **Stamens** 4, didynamous, ascending under upper lip or slightly exserted, upper pair longer than lower; anthers 2-thecous; thecae parallel, distinct. **Style** shortly 2-fid; lobes equal. **Nutlets** ovoid, smooth. $x = 10$ (1 report).

Species 1, originally from Madeira and the Canary Islands, now a widespread weed; naturalised in Western Cape.

Clerodendrum L. 7191000

Linnaeus: 109 (1753); Linnaeus: 285 (1754); Baker: 292 (1900) as *Clerodendron*; Pearson: 218 (1912) as *Clerodendron*; Phillips: 639 (1951); Verdcourt: 84 (1992).

Trees, shrubs, or perennial herbs, rarely spinescent. **Leaves** entire or toothed. **Flowers** ± regular, usually in lax, pedunculate cymes in axils of upper leaves or terminal, sometimes in crowded, terminal heads or corymbs. **Calyx** 5-lobed; tube somewhat narrow or campanulate, sparsely glandular, sometimes hairy. **Corolla** white, blue, purple-red, 5-lobed; tube narrowly cylindrical, straight or curved, often widened towards throat, sometimes very long or only as long as calyx; limb spreading or reflexed, anterior lobes larger than posterior pairs. **Stamens** 4, didynamous, arising on upper part of corolla tube; filaments linear, often long-exserted; anther thecae scarcely diverging. **Ovary** imperfectly 4-locular; style linear, usually exserted; stigma 2-fid. **Drupe** obovoid or globose, often 4-grooved and 4-lobed; mesocarp ± fleshy; endocarp bony or crustaceous, separating into 4 pyrenes or 2 pairs of pyrenes. $x = 13$ (1 report) (B-chromosomes, polyploidy).

Species ± 400, in tropical and subtropical regions of the Old World; 20 widespread in sthn Afr., but absent from Northern and Western Cape.

Endostemon N.E.Br. 7345010

Brown: 295 (1910); Launert & Schreiber: 10 (1969); Codd: 127 (1985).

Orthosiphon sect. *Diffusi* Briq.: 372 (1895). *Pseudocimum* Bremek.: 251 (1933).

Perennial herbs or soft shrublets. **Leaves** subentire or toothed. **Inflorescences** terminal on main or lateral branches; flowers in 2–6(–12)-flowered verticils; bracts persistent, small or large. **Calyx** 5-toothed, bilabiate, accrescent; tube campanulate to tubular, gibbous, usually conspicuously ribbed; upper tooth the largest, ovate, erect, conspicuously veined, margin slightly decurrent; 4 lower teeth horizontal, lanceolate-deltoid to subulate or lateral teeth occasionally oblong. **Corolla** subequally 4-lobed; tube cylindrical, slightly wider at throat; lobes flat or nearly so with uppermost and lowest lobe sometimes longer than 2 lateral lobes. **Stamens** 4, included, arising above middle of corolla tube; filaments very short, hairy or 0; anthers 1-thecous, reniform. **Style** included, simple or obscurely bifid. **Nutlets** suborbicular or oblong, sometimes mucilaginous on wetting. $x = 6$ (1 report, polyploidy).

Species 17, mainly in Africa; 3 species in NW Namibia, N Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Englerastrum Briq. 7353000

Briquet: 178 (1895b); Briquet: 358 (1897); Baker: 445 (1900); Morton: 257 (1962); Launert & Schreiber: 11 (1969); Codd: 177 (1985).

Soft herbs, annual or perennial, decumbent or erect. **Leaves** subsessile or petiolate, membranous, shallowly crenate. **Inflorescences** terminal on main and lateral branches for almost entire length of stem; branches slender, cymes panicled; flowers small, solitary (or rarely 2) in axils of minute bracteoles. **Calyx** campanulate, equally 5-toothed. **Corolla** small, bilabiate, usually blue; upper lip erect, short, subequally 4-lobed, lower lip slightly longer, patent, keel-shaped. **Stamens** 4, declinate, arising at mouth of corolla tube, included in lower corolla lip; filaments shortly united at base. **Style** slightly exceeding stamens, shortly forked at apex. **Nutlets** smooth. $x = 7$ (6) (high polyploidy).

Species 20, 6 in tropical Africa; 1 species: *Englerastrum schweinfurthii* Briq. is recorded from along the Okavango and Zambesi Rivers (Caprivi area) in Namibia.

Geniosporum Wall. ex Benth. 7363000

Bentham: t. 1300 (1830); Bentham: 19 (1832); Bentham: 44 (1848); Briquet: 367 (1897); Baker: 350 (1900); Brown: 293 (1910); Codd: 215 (1985).

Perennial herbs. **Leaves** opposite or ternate, serrate. **Inflorescences** terminal, spike-like; flowers in dense, opposite, many-flowered, cymose clusters subtended by relatively large bracts, lower bracts leaf-like, often blotched with white or mauve. **Calyx** sub-bilabiate; tube at first campanulate, elongating and becoming tubular; upper lip of 3 subequal teeth; lower lip smaller, emarginate. **Corolla** small, bilabiate; tube campanulate; upper lip short, broad, subequally 4-lobed; lower lip narrow, oblong, concave. **Stamens** 4, didynamous, declinate, exserted; filaments pubescent in lower half, upper pair arising below middle of tube, lower pair arising near throat; anthers 1-thecous. **Disc** saucer-shaped, slightly produced in front. **Style** filiform, exserted, 2-lobed. **Nutlets** ellipsoid, compressed, brown. $x = 9$ (7—1 report) (polyploidy—1 report).

Species ± 25, in tropical Africa, Madagascar and southeast Asia; 1 species is found from Magoebaskloof (Northern Province) along the eastern escarpment to Barberton and westward to Witbank (Mpumalanga) and Pretoria Districts (Gauteng), extending into Swaziland.

Hemizygia (Benth.) Briq. 7365000

Bentham: 41 (1848); Briquet: 368 (1897); Launert & Schreiber: 11 (1969); Codd: 193 (1985).

Ocimum sect. *Hemizygia* Benth.: 41 (1848). *Orthosiphon* in sense of Baker: 365 (1900) in part. *Orthosiphon* in sense of N.E.Br.: 237 (1910) in part. *Bouetia* A.Chev.: 200 (1912).

Perennial soft shrubs or annual herbs, or stems arising annually from a perennial woody rootstock. **Leaves** opposite or rarely ternate, sessile or petiolate, usually toothed. **Inflorescences** terminal, spike-like, paniculate; verticils crowded or lax, 2–6-flowered; bracts small and caducous or persistent, or terminal few pairs large and persistent as a colourful coma. **Calyx** bilabiate, 5-toothed, uppermost tooth broadly ovate to subrotund, decurrent on tube; 2 lower teeth subulate to spinescent, longer than 2 lateral, deltoid-lanceolate teeth. **Corolla**

bilabiate; tube subcylindrical or widening slightly to the truncate mouth; upper lip short, erect, obscurely 3- or 4-lobed; lower lip longer than upper, concave, horizontal to deflexed. **Stamens** 4, didynamous, usually exserted; upper pair arising near or below middle of corolla tube, filaments free, usually pubescent near base and sometimes higher as well; lower pair arising at corolla mouth, filaments connate for all or part of their length (occasionally almost free), glabrous. **Disc** usually crenate, produced in front. **Style** exserted, minutely bifid or occasionally clavate. **Nutlets** ovoid. $x = 7$ (1 report) (polyploidy).

Species ± 35, mainly in Africa; 28 in sthn Afr.: northern parts of Namibia and Botswana, but most species found in Northern Province, Mpumalanga and also in Gauteng and North-West; a few species in KwaZulu-Natal and Eastern Cape.

Holostylon Robyns & Lebrun 7350020

Robyns & Lebrun: 103 (1929); Codd: 173 (1985).

Herbs or subshrubs with 1 or more erect, virgate stems arising from a perennial base. **Leaves** often quite large, margin toothed. **Inflorescences** terminal, paniculate, often occupying a third or more of the plant; bracts minute, each subtending a single flower. **Calyx** not or slightly gibbous at base, subequally 5-toothed, accrescent; tube campanulate; teeth short, deltoid to deltoid-lanceolate. **Corolla** bilabiate; tube short, declinate, bent and expanding just beyond calyx; upper lip erect, short, obscurely 4-lobed; lower lip large, boat-shaped. **Stamens** 4, declinate, arising from mouth of corolla tube and lying in lower lip; filaments united at base into a sheath open above. **Style** slightly exceeding stamens; stigma entire. **Nutlets** subrotund, slightly compressed, triquetrous, glabrous.

Species ± 4, in tropical Africa; 1 in sthn Afr.: *Holostylon baumii* (Gürke) G.Tayl., known from Botswana.

Hoslundia Vahl 7357000

Vahl: 212 (1804); Bentham: 706 (1835); Bentham: 54 (1848); Bentham: 1174 (1876); Briquet: 363 (1897); Baker: 377 (1900); Cooke: 297 (1910); Launert & Schreiber: 13 (1969); Codd: 183 (1985).

Spreading, erect or subscandent herb or soft shrub. **Leaves** sometimes ternate, ovate-lanceolate to ovate-elliptic, margin crenate-dentate. **Inflorescences** terminal, lax panicles; verticils 2–4-flowered; bracts minute, linear-lanceolate; pedicels articulate at top. **Calyx** subequally 5-toothed; teeth narrow; tube cylindric, becoming globose and fleshy in fruit. **Corolla** bilabiate, white or cream; tube straight, subcylindric; upper lip short, erect, 3-lobed; lower lip patent. **Stamens** didynamous, only lower 2 fertile, declinate, arising near throat; upper pair minute, arising in throat, included. **Disc** produced on one or two sides, one lobe often exceeding ovary. **Style** exserted, shortly 2-lobed. **Fruit** subglobose, berry-like; orange-coloured, usually enclosing 2 or 3 nutlets; nutlets ellipsoid-orbicular, compressed. $x = 6$ (polyploidy).

Monotypic: *Hoslundia opposita* Vahl is widespread throughout tropical Africa; in sthn Afr. it occurs in N Namibia and Botswana, Northern Province, Mpumalanga, Swaziland and N KwaZulu-Natal.

*Hyptis Jacq. 7342000

Jacquin: 101 (1787); Bentham: 64 (1833); Bentham: 85 (1848); Bentham: 1178 (1876); Briquet: 333 (1897); Baker: 447 (1900); Cooke: 297 (1910); Codd: 117 (1985).

Mesosphaerum P.Browne: 257 (1756); Kuntze: 525 (1891). *Bystropogon* L'Hér.: 19 (1789).

Annual or perennial herbs or soft shrubs. **Leaves** crenate-dentate to serrate. **Inflorescences** terminal on main or lateral branches; verticils several to many-flowered, crowded; bracts leafy below, becoming smaller towards apex; bracteoles linear to ovate. **Calyx** tubular-campanulate, ribbed, subequally 5-toothed; tube somewhat accrescent in fruit; teeth subulate. **Corolla** small, 5-lobed, ± bilabiate; tube slightly exceeding calyx; lowest lobe saccate. **Stamens** 4, didynamous, declinate, arising in corolla throat; filaments linear, free; anthers 1-thecous, scarcely exserted. **Style** with stigma shortly 2-fid or entire. **Nutlets** smooth or punctate-rugulose. $x = 8$ (7) (high polyploidy).

Species ± 300, in warm and tropical regions of America and Africa; 3 in sthn Afr.: *Hyptis pectinatus* (L.) Poit. is apparently indigenous and is found in Botswana, the other 2 are from tropical America and naturalised.

Karomia Dop 7192010

Dop: 1052 (1932); Phillips: 640 (1951) under *Holmskioldia* Retz.; Verdcourt: 82 (1992).

Shrubs. **Leaves** opposite, simple, entire or toothed, deciduous, petiolate. **Flowers** irregular, in axillary or terminal cymes; bracts small, deciduous. **Calyx** coloured, membranous, with obconic or campanulate tube; lobed or subtruncate, limb broadly expanded, very accrescent to form an entire or 5-lobed, usually venose, rotate, plate-like structure in fruit. **Corolla** pink, blue and shades of purple; tube gibbous, very asymmetric, contracted beneath limb, split dorsally almost to base; limb 5-lobed and ± 1-lipped; glandular. **Stamens** 4, arising on upper part of corolla tube; filaments long-exserted, linear with hairy ridge at base. **Ovary** imperfectly 4-locular, densely hairy and glandular on upper part; style long-exserted, filamentous, 2-lobed. **Fruit** dry and hard, turbinate or turbinate-obpyramidal, rounded above or ± flat and with 4 small horns in a cross, at length dividing into 4 pyrenes.

Species 9, 1 in SE Asia, 8 in Africa and Madagascar; 1 in sthn Afr.: *Karomia speciosa* (Hutch. & Corbishley) R.Fern., Mpumalanga, Swaziland and KwaZulu-Natal.

*Lamium L. 7271000

Linnaeus: 579 (1753); Linnaeus: 252 (1754); Bentham: 503 (1848); Bentham: 1210 (1876); Briquet: 254 (1896); Baker: 468 (1900); Ball: 147 (1972); Codd: 47 (1985).

Annual or perennial soft herbs. **Leaves** ± cordate, toothed or incised. **Inflorescences** usually simple, of one to several, spaced or fairly crowded verticils; verticils few- to many-flowered; bracts broad-based, often clasping; bracteoles not evident. **Calyx** tubular-campanulate, usually 5-nerved with 5 equal or subequal teeth, uppermost often the longest. **Corolla** bilabiate, white, pink or purple; tube dilated towards mouth, usually longer than calyx; upper lip ascending, concave, ovate or oblong, usually entire; lower lip spreading or deflexed, obovate, emarginate, with or without small lateral lobes. **Stamens** 4, didynamous, anterior pair longer, arcuate in upper lip; anthers 2-thecous, divaricate, often hirsute on back. **Style** with stigma 2-lobed. **Nutlets** oblong, triquetrous, somewhat truncate at apex, smooth or tuberculate. $x = 9$ (8) (polyploidy).

Species ± 40, mainly in the North Temperate zone of the Old World; 1 species: **Lamium amplexicaule* (L.) Benth. a native of Europe, is now a widespread weed and fairly widely distributed in gardens and waste places in sthn Afr.

Leonotis (Pers.) R.Br. 7264000

Persoon: 127 (1807); Brown: 504 (1810); Bentham: 534 (1848); Bentham: 1214 (1876); Briquet: 246 (1896); Baker: 490 (1900); Skan: 374 (1910); Launert & Schreiber: 15 (1969); Iwarsson: 31 (1985).

Phlomis sect. *Leonotis* Pers.: 127 (1807). *Hemisodon* Raf.: 88 (1837).

Annual or perennial robust herbs, or shrubs, up to 5 m tall. **Stem** rounded at base, 4-angled and 4-grooved at

apex, upper 10–25 nodes green, without lenticels, nodes thicker and more hairy than internodes, often with prominent leaf scars. **Leaves** crenate. **Inflorescences** composed of 3–11 verticils per shoot, dense, spherical, axillary, many-flowered; bracts leaf-like; bracteoles linear, spinescent. **Calyx** tubular, 10-nerved, 8–10-toothed; teeth usually rigid, spinescent or rarely almost obsolete; dorsal calyx tooth sometimes dominating, supported by 3 calyx veins. **Corolla** tubular, 2-lipped, white, covered by orange-coloured (rarely white) hairs; tube with 1–3 transverse fringes of hairs inside, 2–8 mm above abscission zone; upper corolla lip entire, almost as long as tube, a fringe of longer hairs covering anthers and stigma; lower corolla lip 3-lobed, soon withering and becoming patent or reflexed, lobes subequal or the middle one larger and faintly retuse. **Stamens** 4, arising at mouth of corolla, didynamous, lower pair longer; anthers 2-thecous, divaricate, subconfluent. **Disc** ventrally enlarged. **Style** not bifid, only ventral branch developed and dorsal stigma surface sessile. **Nutlets** glabrous, oblong, 3-angled in transverse section, distally truncate and glandular. $x = 6, 7$ (polyploidy).

Species 10–15, tropical Africa; 3 species are known from sthn Afr., widespread.

Leucas R.Br. 7268000

Brown: 504 (1810); Bentham: 523 (1848); Bentham: 1212 (1876); Briquet: 250 (1896); Baker: 472 (1900); Skan: 369 (1910); Launert & Schreiber: 16 (1969); Codd: 39 (1985).

Lasiocorys Benth.: 600 (1834); Bentham: 534 (1848); Bentham: 1213 (1876); Baker: 469 (1900); Skan: 372 (1910); Phillips: 645 (1951).

Annual or perennial herbs or subshrubs. **Leaves** thin or thick-textured, entire or toothed. **Inflorescences** usually simple, of few to many, spaced or fairly crowded verticils; verticils 2–many-flowered, often in glomerate clusters; bracts leaf-like, often smaller towards apex of inflorescence; bracteoles linear, ascending, small or conspicuous. **Calyx** shorter or longer than corolla tube, tubular or tubular-campanulate, rarely inflated, 10-nerved, straight or curved, sometimes oblique at mouth; teeth 5–10, equal or unequal, often spine-tipped. **Corolla** bilabiate, white; tube tubular, widening above, sometimes shortly constricted at base, annular-pilose or annular-papillose within, rarely glabrous; upper ascending or spreading, concave or flattish, entire or rarely emarginate or 2-lobed, longer than, subequal to or shorter than lower lip, usually with stiff brush-like hairs; lower lip spreading or deflexed, 3-lobed, median lobe the largest. **Stamens** 4, didynamous, lower pair longer than upper, ascending under the upper lip, included or shortly exserted; anthers approximate in pairs, 2-thecous with the thecae divaricate and finally confluent. **Style** terete, ascending under upper lip, unequally 2-lobed at apex. **Nutlets** ovoid-triquetrous, smooth, obtuse or somewhat flattened at apex. $x = 11, 7$ (polyploidy).

Species ± 150, mainly in tropical Africa and Asia; 7 species are widespread in sthn Afr. but do not occur in the winter-rainfall region and adjacent areas.

*Marrubium L. 7238000

Linnaeus: 582 (1753); Linnaeus: 254 (1754); Bentham: 1206 (1876); Briquet: 230 (1896); Cullen: 137 (1972); Codd: 25 (1985).

Perennial herbs, usually tomentose or lanate. **Leaves** petiolate, rugose, toothed. **Inflorescences** of spaced verticils; verticils dense, often glomerate, many-flowered; bracts leaf-like, becoming smaller towards apex; bracteoles usually present, linear-subulate; flowers sessile. **Calyx** tubular, widening towards mouth, 5–10-nerved, densely hairy inside mouth; teeth 10, subequal, spine-tipped, recurved or hooked. **Corolla** small, white to purplish; tube included in calyx, glabrous or with a ring of hairs within; upper lip erect, almost flat or concave, almost entire to deeply 2-fid; lower lip slightly longer than upper, spreading, 3-fid, middle lobe broader and emarginate. **Stamens** 4, didynamous, included in corolla lobe, anterior pair the longer; anthers 2-thecous, thecae divaricate, confluent. **Style** 2-lobed at apex, lobes obtuse. **Nutlets** ovoid, smooth truncate at apex. $x = 17$ (7, 9) (polyploidy).

Species 30, natives of Europe, N Africa and Asia; 1 species: **Marrubium vulgare* L. from Europe is now a widespread weed in E Free State, Lesotho and Eastern Cape.

Mentha L. 7328000

Linnaeus: 576 (1753); Linnaeus: 250 (1754); Bentham: 168 (1833); Bentham: 164 (1848); Bentham: 1182 (1876); Briquet: 317 (1896); Baker: 451 (1900); Cooke: 303 (1910); Harley: 183 (1972); Codd: 107 (1985).

Aromatic herbs, glabrous or pubescent. **Leaves** usually toothed. **Inflorescences** terminal on main and lateral branches, spike-like, verticils crowded, many-flowered; flowers small; bracts leaf-like to smaller than leaves; bracteoles linear. **Calyx** 10-nerved, subequally 5-toothed, scarcely accrescent. **Corolla** slightly longer than calyx, obscurely bilabiate, 4-lobed; tube funnel-shaped. **Stamens** 4, arising at middle of corolla tube, subequal, spreading, normally exserted (shorter when abortive); filaments linear; anthers 2-thecous. **Disc** shallowly lobed. **Style** linear, exserted, shortly 2-fid. **Nutlets** ovoid, smooth or reticulate. $x = 6$ (8, 10) (aneuploids, high polyploidy).

Species 25, mainly in temperate regions of the Old World; 2 species: *Mentha aquatica* L. and *M. spicata* L. and three varieties of *M. longifolia* (L.) Huds. are found in sthn Afr., widespread.

Neohyptis J.K.Morton 7347010

Morton: 272 (1962); Codd: 135 (1985).

Annual, sparingly branched herbs; stems erect or decumbent, quadrangular. **Leaves** sessile, obscurely crenate. **Inflorescences** terminal or in axils of leaves of upper half of stem, short with verticils densely crowded; bracts persistent. **Calyx** tubular-campanulate, slightly ventricose when mature, equally 5-toothed; teeth lanceolate, acute. **Corolla** bilabiate; tube straight; upper lip erect, 4-lobed; lower lip concave, spreading. **Stamens** 4, didynamous, declinate, not exceeding lower corolla lip; filaments fused in pairs towards base, arising in throat. **Nutlets** small, glabrous.

Monotypic: *Neohyptis paniculata* (Baker) J.K.Morton is known from Angola and Zambia to west tropical Africa; only in N Botswana in sthn Afr.

Ocimum L. 7366000

Linnaeus: 597 (1753); Linnaeus: 259 (1754); Bentham: 1 (1832); Bentham: 31 (1848); Bentham: 1171 (1876); Briquet: 369 (1897); Baker: 334 (1900); Brown: 233 (1910); Launert & Schreiber: 20 (1969); Codd: 219 (1985); Paton: 403 (1992).

Herbs or soft shrublets. **Leaves** dentate to entire. **Inflorescences** terminal, spike-like, on main and lateral branches in upper part of plant; flowers shortly pedicellate in usually 6-flowered verticils; bracts much smaller than leaves; pedicels ascending. **Calyx** bilabiate, 5-toothed; tube short, campanulate; upper tooth much larger than the rest, broadly ovate to subrotund, decurrent on tube; two lateral teeth small, subulate; two lower teeth fused, forming an oblong, emarginate or 2-toothed lip. **Corolla** small, bilabiate, mauve to whitish; tube campanulate, slightly concave. **Stamens** 4, didynamous,

shortly exserted; upper pair arising near base of corolla tube, kneed and with a tuft of hairs near base of filaments; lower pair arising in corolla mouth; anthers 1-thecous. **Disc** saucer-shaped, 4-lobed. **Ovary** glabrous; style exserted; stigma shortly 2-lobed. **Nutlets** globose, mucilaginous when wetted. $x = 8$ (6, 9, 11, 13) (aneuploids, high polyploidy, B-chromosomes).

Species ± 30, in the tropics and subtropics of the Old and New World; 3 species in the north/northeastern half of sthn Afr.

Orthosiphon Benth. 7367000

Bentham: t. 1300 (1830); Bentham: 25 (1832); Bentham: 49 (1848); Bentham 1174 (1876); Briquet: 372 (1897); Baker: 365 (1900); Brown: 237 (1910); Morton: 454 (1963); Codd: 229 (1985).

Nautochilus Bremek.: 253 (1933).

Herbs or undershrubs, sometimes with tuberous roots. **Leaves** opposite or rarely ternate, coarsely crenate or dentate to subentire. **Inflorescences** terminal, spike-like, on main and sometimes on upper lateral branches; bracts small, persistent; flowers 1–6 in axils of each bract, forming 2–12-flowered verticils 10–20 mm apart. **Calyx** 5-toothed, 2-lipped; tube cylindric to campanulate; upper tooth broadly ovate-orbicular with margin ± decurrent on tube; lower teeth subequal, ovate-deltoid, acuminate to subulate, 2 lowest usually longer than 2 laterals. **Corolla** bilabiate; tube narrowly to broadly cylindric, straight or curved; upper lip erect, 3- or 4-lobed; lower lip horizontal to recurved, concave to boat-shaped. **Stamens** 4, free, didynamous, declinate, exserted; lower pair arising near mouth; upper pair arising further back in corolla tube; filaments glabrous or pilose at base; anthers 1-thecous. **Disc** saucer-shaped, often with a ventral lobe. **Style** filiform, ± capitate, lying together with and subequal to stamens. **Nutlets** suborbicular to oblong, glabrous. $x = 7$ (6, 11, 13) (polyploidy).

Species 40–50, in the tropics of the Old World; 9 in sthn Afr.: Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Plectranthus L'Hér. 7350000

L'Héritier: t. 41, 42 (1788); Bentham: 29 (1832); Bentham: 62 (1848); Bentham: 1175 (1876); Briquet: 352 (1897); Baker: 398 (1900); Cooke: 266 (1910); Launert & Schreiber: 21 (1969); Codd: 371 (1975); Codd: 137 (1985).

Germanea Lam.: 690 (1788); Hiern: 865 (1900). *Coleus* Lour.: 372 (1790); Bentham: 47 (1832); Bentham: 70 (1848); Bentham: 1176 (1876); Briquet: 359 (1895); Baker: 422 (1900); Cooke: 289 (1910); all in part. *Neomuellera* Briq.: 186 (1894). *Burnatastrum* Briq.: 358 (1895). *Ascocarydion* G.Taylor: 162 (1931).

Annual or perennial herbs or subshrubs; stems and leaves herbaceous, semisucculent or succulent. **Leaves** mostly crenate-dentate. **Inflorescences** usually terminal, spike-like or paniculate; flowers in verticils, few-flowered cymes or dichasia, or occasionally solitary; bracts small, clearly differentiated from leaves. **Calyx** 2-lipped to subequally 5-toothed; when 2-lipped, upper lip consisting of a large single tooth, lower lip of 4 lanceolate-deltoid to subulate teeth; tube glabrous or villous within, sometimes gibbous at base. **Corolla** bilabiate; tube usually bent and variously expanded near base, occasionally expanding gradually, rarely straight; upper lip usually 4-lobed, shorter than lower boat-shaped lip. **Stamens** 4, rarely 2 abortive, arising at corolla mouth, free or united in a sheath at base, declinate in lower lip of corolla; anthers 1-thecous. **Style** lying with stamens in lower lip of corolla; stigma shortly 2-lobed. **Nutlets** ovoid or oblong, smooth. $x = 6, 7$ (11, 13, 15, 17) (polyploidy).

Species ± 300, in tropical and warm regions of the Old World; 45 widespread in sthn Afr., but absent from Northern Cape.

Premna L. 7185000

Linnaeus: 154, 252 (1771); Baker: 287 (1900); Pieper: 80 (1928); Phillips: 638 (1951); Verdcourt: 68 (1992).

Trees, shrubs, sometimes climbing, glabrous to densely hairy. **Leaves** opposite or in whorls of 3 or 4, usually distinctly petiolate, entire or toothed, often dotted with resinous glands. **Flowers** bisexual or plants polygamous, flowers sometimes bilabiate, in terminal, corymbose or panicled cymes; bracts small. **Calyx** 2–5-toothed, or 5-lobed; tube cup-shaped or campanulate; somewhat accrescent in fruit. **Corolla** 5- or subequally 4-lobed, sometimes 2-lipped, white; tube sometimes somewhat curved, gibbous at base, throat often hairy. **Stamens** 4, subdidynamous, arising in or near throat of corolla tube; anther thecae divergent. **Ovary** 2- or 4-locular, with 4 ovules; style terete, exserted, 2-lobed. **Fruit** a drupe with bony endocarp; pyrene 4-locular. $x = 19$ (7) (1 report, B-chromosomes, polyploidy)

Species ± 200, mainly warmer regions of the Old World; 2 in sthn Afr.: *Premna mooiensis* (H.Pearson) Pieper, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape, *P. senensis* Klotzsch, Namibia and Botswana.

***Prunella** L. 7254000

Linnaeus: 600 (1753); Linnaeus: 261 (1754) as *Brunella*; Bentham: 409 (1848) as *Brunella*; Bentham: 1203 (1876) as *Brunella*; Briquet: 241 (1896) as *Brunella*; Smith: 162 (1972); Codd: 29 (1985).

Soft, perennial herbs, usually decumbent or prostrate. **Leaves** petiolate, entire. **Inflorescences** dense, spike-like or subcapitate; verticils 4–6-flowered, closely placed; bracts differing from leaves, usually large, ovate to orbicular; flowers very shortly pedicellate. **Calyx** tubular-campanulate, subcompressed, 10-nerved, reticulate-veined, bilabiate; upper lip broad, shortly 3-toothed; lower lip narrower with 2 long, subulate teeth. **Corolla** tube shortly exserted from calyx; upper lip erect, somewhat hooded, entire; lower lip slightly shorter, deflexed, 3-lobed. **Stamens** 4, didynamous, ascending beneath upper lip, lower pair the longer; filaments with a subterminal tooth or claw; anthers 2-thecous. **Style** bifid, lobes subulate. **Nutlets** ovoid or oblong, keeled, smooth. $x = 7$ (aneuploids, polyploidy).

Species 5–7, in temperate regions of both hemispheres; 1 species: **Prunella vulgaris* L. from Europe, naturalised in the midlands of KwaZulu-Natal, occurring in wet vleis or along moist forest margins.

Pycnostachys Hook. 7347000

Hooker: t. 202 (1825); Bentham: 61 (1833); Bentham: 83 (1848); Bentham: 1177 (1876); Briquet: 350 (1897); Baker: 378 (1900); Cooke: 290 (1910); Codd: 131 (1985).

Echinostachys E.Mey.: 243 (1837).

Perennial, erect herbs or soft shrubs. **Leaves** sometimes whorled, toothed or crenate. **Inflorescences** terminal on main or lateral branches; verticils densely crowded; flowers blue or mauve, rarely whitish; bracts small, distinct from leaves. **Calyx** subequally 5-toothed; teeth subulate, rigid, spinescent. **Corolla** bilabiate; tube cylindric below, enlarging near throat, deflexed; upper lip 4-lobed, shorter than the lower; lower lip large, boat-shaped. **Stamens** 4, didynamous, declinate, arising in corolla throat and lying in lower lip; filaments shortly united at base. **Disc** produced in front. **Style** slender, shortly 2-fid at apex, slightly exceeding stamens in length. **Nutlets** ovoid, black or brown. $x = 17$ (polyploidy).

Species 37, in tropical Africa and Madagascar; 3 in sthn Afr.: N Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and to the Kentani area in Eastern Cape.

Rabdosiella Codd 7350030

Codd: 9 (1984); Codd: 175 (1985); Ryding: 91 (1993).

Rabdosia in sense of Codd: 117 (1973); Codd: 436 (1975); Dyer: 532 (1975).

Soft shrubs branched above, or stems 1–several, arising annually from a woody rootstock, glandular-puberulous to densely tomentose. **Leaves** subsessile or shortly petiolate, ovate-lanceolate to broadly ovate, crenate-dentate. **Inflorescences** a terminal panicle; flowers in dense, somewhat scorpioid cymes. **Calyx** erect at fruiting stage; tubular, 10-nerved; teeth subequal, narrowly deltoid. **Corolla** white to cream, flushed with mauve on the lips; upper lip erect, lower lip spreading, shallowly boat-shaped. **Stamens** 4, declinate, arising at mouth of corolla tube; enclosed in lower corolla lip; filaments free. **Stigma** minutely bifid. **Nutlets** ovoid or oblong, smooth.

Monotypic: *Rabdosiella calycina* (Benth.) Codd is widespread in the eastern parts of sthn Afr. in Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho and Eastern Cape.

Salvia L. 7290000

Linnaeus: 23 (1753); Linnaeus: 15 (1754); Bentham: 190 (1833); Bentham: 262 (1848); Bentham: 1194 (1876); Briquet: 270 (1896); Baker: 456 (1900); Skan: 307 (1910); Launert & Schreiber: 26 (1969); Codd: 79 (1985).

Annual or perennial herbs, undershrubs or shrubs with various kinds of indumentum. **Leaves** entire, toothed, or ± deeply lobed. **Inflorescences** terminal on branches, spike-like or panicled; flowers in 2–many-flowered verticils; bracts usually reduced, rarely similar to upper leaves, sometimes showy, deciduous or persistent; bracteoles usually present. **Calyx** 2-lipped, ± as long as corolla tube, sometimes accrescent, variously hairy and often glandular; upper lip entire or 3-toothed, median tooth often shorter or obsolete; lower lip equally 2-toothed, longer than the upper. **Corolla** 2-lipped; tube straight or curved, usually enlarging towards throat, annular-pilose or exannulate within, invaginated with a plate of internal tissue or not; upper lip usually longer than lower lip, straight or falcate, usually concave and ± compressed, entire or bifid; lower lip spreading, 3-lobed, median lobe usually much larger than the two lateral. **Stamens** 2, curved; connective produced and lying within upper lip and bearing an oblong or linear anther theca; other part of connective produced into a variously shaped appendage, sterile or bearing a much reduced anther theca, appendages cohering or not; staminodes 2, small and usually inconspicuous. **Style** included or exserted from corolla, usually exceeding stamens, unequally 2-lobed. **Nutlets** triquetrous to compressed, ovoid to subglobose, smooth, mucilaginous on wetting or not. x = 8, 11 (6, 7, 9, 10) (aneuploids, high polyploidy, B-chromosomes).

Species ± 900, widely distributed in temperate and tropical regions of both hemispheres; 27 species in sthn Afr., widespread; 1 European species and 3 from tropical America have become naturalised.

Satureja L. 7305000

Linnaeus: 567 (1753); Linnaeus: 247 (1754); Bentham: 351 (1834); Bentham: 208 (1848); Bentham: 1187 (1876); Briquet: 296 (1896); Codd: 103 (1985); often spelt *Satureia*.

Micromeria Benth.: t. 1282 (1829); Bentham: 368 (1834); Bentham: 212 (1848); Bentham: 1188 (1876); Baker: 452 (1900); Cooke: 306 (1910).

Perennial herbs or soft shrubs. **Leaves** small, entire or obscurely toothed. **Flowers** solitary or in few- to several-flowered cymes in axils of undifferentiated leaves along upper half of stems (or sometimes lower). **Calyx** tubular or tubular-campanulate, 13–15-nerved, subequally 5-toothed, scarcely enlarging in fruiting stage. **Corolla** scarcely or well exserted from calyx, dimorphic in some species; tube straight, cylindric below, campanulate above; upper lip short, broad, emarginate; lower lip longer, 3-lobed, middle lobe the largest. **Stamens** 4, didynamous, included, arising near throat, curved upwards, two lower the longer. **Style** included, 2-lobed. **Nutlets** ovoid to oblong, smooth. x = 15 (9, 11, 12) (aneuploids, polyploidy, B-chromosomes).

Species ± 30, cosmopolitan; 4 in sthn Afr.: Northern Province, Gauteng, Mpumalanga, KwaZulu-Natal, Lesotho and Eastern Cape.

*Scutellaria L. 7234000

Linnaeus: 598 (1753); Linnaeus: 260 (1754); Bentham: 412 (1848); Bentham: 1201 (1876); Briquet: 225 (1896); Baker: 461 (1900); Richardson: 135 (1972); Codd: 17 (1985).

Perennial, decumbent herb. **Leaves** usually small and soft, entire or toothed. **Inflorescences** racemose, lax or dense; bracts leaf-like, often smaller towards apex of inflorescence; verticils 2-flowered. **Calyx** pouch-shaped, 2-lipped; lips equal in length, entire, broad, rounded, upper bearing a transverse protruding outgrowth and finally deciduous, lower persistent. **Corolla** 2-lipped; tube ascending-arcuate or somewhat sigmoid, upper lip erect, concave or galeate, usually obliquely joined to lateral lobes of lower lip; lower lip spreading with an oblong central lobe and 2 smaller lateral lobes. **Stamens** 4, didynamous, ascending under upper lip and included by it, lower pair the longer; anthers of upper pair 2-thecous, of the lower with one theca imperfect or obsolete. **Ovary** on variably developed gynobase; style slender, included in upper lip, subequal to stamens, apex subulate with one branch wanting or short and appressed to the longer. **Nutlets** ovoid to subglobose, rarely obovoid, borne on a raised gynophore, tuberculate or variously sculptured. x = 11, 17 (7, 10, 12, 13, 15) (aneuploids, B-chromosomes, polyploidy).

Species ± 300, cosmopolitan; 1 species: **Scutellaria racemosa* Pers. of South American origin, is naturalised in Gauteng, Mpumalanga and KwaZulu-Natal.

Solenostemon Thonn. 7354000

Thonning: 271 (1827); Briquet: 359 (1897); Morton: 251 (1962); Codd: 437 (1975); Codd: 179 (1985).

Coleus sect. *Solenostemon* (Thonn.) Benth.: 52 (1832); Bentham: 72 (1848).

Perennial, erect or spreading herbs or subshrubs. **Leaves** often blotched on upper surface or variegated (cultivars). **Inflorescences** terminal; flowers in pedunculate or sessile, often somewhat glomerate, dichasia; bracts differentiated from leaves, early deciduous. **Calyx** bilabiate, 5-toothed; uppermost tooth the largest, forming an ovate erect lobe; 2 lowermost teeth fused, forming a strap-shaped emarginate lip; 2 lateral teeth short and truncate to rounded. **Corolla** bilabiate; tube ± sigmoid, narrow and ascending at base then deflexed about middle and expanding to throat; upper lip obscurely 4-lobed; lower lip larger than upper, boat-shaped. **Stamens** 4, declinate, arising at mouth of corolla tube and lying in lower lip; filaments usually shortly united at base, occasionally free. **Style** lying with stamens in lower lip of corolla. **Nutlets** ovoid-triquetrous, glabrous. x = 7 (10, 11, 13) (aneuploids, polyploidy).

Species ± 60, in Africa, Asia and Malesia; 2 species: *Solenostemon latifolius* (Hochst. ex Benth.) J.K.Morton and *S. rotundifolius* (Poir.) J.K.Morton from Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Stachys L. 7281000

Linnaeus: 580 (1753); Linnaeus: 253 (1754); Bentham: 525 (1834); Bentham: 462 (1848); Bentham: 1208 (1876); Briquet: 260 (1896); Baker: 465 (1900); Skan: 336 (1910); Codd: 51 (1985).

Annual or perennial herbs, undershrubs, or sometimes shrubs, with various kinds of indumentum or sometimes nearly glabrous. **Leaves** sessile or petiolate, entire or toothed. **Inflorescences** terminal or axillary, spike-like, sometimes panicled; flowers in 2–many-flowered verticils, sessile or pedicellate; bracts leaf-like or reduced; bracteoles usually present, linear. **Calyx** subequally 5-toothed or rarely ± bilabiate, 5–10-nerved; teeth usually shorter than tube, ovate-acuminate to lanceolate-acuminate, sometimes ending in a short bristle-like point. **Corolla** bilabiate; tube straight or curved, sometimes pubescent without and usually annular-pilose near base within; upper lip erect or ascending, usually concave or arched, entire or very shortly emarginate, usually shorter than lower lip; lower lip spreading or deflexed, 3-lobed, with middle lobe the largest. **Stamens** 4, didynamous, ascending under the upper lip, lower pair the longer, usually shortly exserted from corolla tube; anthers 2-thecous, with thecae usually divergent and at length divaricate. **Style** terete, as long as stamens, equally bifid. **Nutlets** ovoid or oblong in outline, often triquetrous, obtuse or rounded at apex. $x = 8, 9, 17$ (10, 12, 15) (aneuploids, polyploidy).

Species ± 300, mainly in subtropical and temperate regions of both hemispheres; 42 in sthn Afr., widespread.

Syncolostemon E.Mey. 7359000

Meyer: 230 (1838); Bentham: 53 (1848); Bentham: 1174 (1876); Briquet: 364 (1897); Brown: 261 (1910); Codd: 185 (1985).

Perennial herbs or soft shrubs. **Leaves** entire or toothed. **Inflorescences** terminal, paniculate, crowded or lax; flowers in 2–6-flowered verticils; bracts small, caducous. **Calyx** subequally 5-toothed or uppermost tooth somewhat larger than remaining 4; tube campanulate or cylindrical, scarcely enlarging but becoming suborbicular in some species at fruiting stage, glabrous or pubescent in throat. **Corolla** bilabiate; tube cylindrical to cylindric-campanulate, widening slightly to truncate mouth; upper lip short, erect, obscurely 3- or 4-lobed; lower lip spreading to deflexed, concave, longer than upper. **Stamens** 4, didynamous, exserted; upper pair arising near or below middle of corolla tube with filaments free, glabrous or pubescent near base; lower pair arising at corolla mouth; filaments united for almost their entire length; anthers 1-thecous. **Disc** lobed, produced in front. **Style** exserted, minutely bilobed. **Nutlets** oblong, sometimes slightly frilled at base.

Species 10, endemic in the eastern parts of sthn Afr.: Mpumalanga, Swaziland, Free State, KwaZulu-Natal and Eastern Cape.

Tetradenia Benth. 7339000

Bentham: t. 1300 (1830); Bentham: 164 (1833); Bentham: 159 (1848); Bentham: 1180 (1876); Briquet: 331 (1897); Codd: 177 (1983); Codd: 113 (1985).

Iboza N.E.Br.: 298 (1910).

Perennial shrublets or soft shrubs, occasionally reaching the stature of a small tree, usually leafless or nearly so at flowering stage. **Stems** brittle or semisucculent, at first somewhat quadrangular and softly glandular-pubescent, terete and glabrescent with age. **Leaves** small or large, those subtending inflorescence branches smaller towards apex of inflorescence, often semisucculent, variously pubescent, crenate-dentate, aromatic. **Inflorescences** terminal, paniculate, often diffusely branched, ultimate branchlets spike-like (referred to as 'flower-spikes'); bracts small, ovate-deltoid to broadly ovate, imbricate in bud stage, caducous or semipersistent. **Flowers** small, functionally unisexual or occasionally bisexual, in whorls of 4–10, sessile or shortly pedicellate, dense or lax, mauve or whitish. **Calyx** minute, campanulate, 3-lobed, divided nearly to base below, upper lobe ovate, lateral lobes oblong, bifid or emarginate often giving calyx a 5-toothed appearance; in female flowers calyx enlarges slightly at maturity and upper lobe becomes erect. **Corolla** small, tubular or funnel-shaped, limb spreading, asymmetrical, 4-lobed, upper lobe emarginate or bifid so that corolla may appear 5-lobed; lobes oblong, rounded, lowest usually the longest. **Stamens** 4, free, erect or spreading, 0 in female flowers. **Disc** 1- or 2-lobed. **Ovary** present but usually infertile in male flowers; style exserted, deeply bilobed. **Nutlets** oblong-triquetrous.

Species 5 or 6, in tropical Africa and Madagascar; 3 in sthn Afr.: N Namibia and Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape, widespread.

Teucrium L. 7212000

Linnaeus: 562 (1753); Linnaeus: 247 (1754); Bentham: 574 (1848); Briquet: 210 (1895); Baker: 500 (1900); Skan: 384 (1910); Codd: 9 (1985).

Herbs, undershrubs or shrubs. **Leaves** usually toothed or ± deeply lobed. **Inflorescences** terminal, cymes 1-flowered with peduncles usually much shorter than leaves or peduncles, usually 2 per node, 3–7-flowered, cymes often as long as or longer than leaves; bracts leaf-like, usually becoming smaller towards apex of inflorescence. **Calyx** ± as long as corolla tube, subequally 5-toothed. **Corolla** small, white, 5-lobed, lowermost lobe the largest, longer than tube, giving a 1-lipped appearance; tube short, hairy in throat. **Stamens** 4, ascending-arcuate between two upper corolla lobes, well exserted; filaments thread-like, villous at base; anthers 2-thecous. **Ovary** shortly 4-lobed; style slightly exceeding stamens, terete, 2-fid, lobes subequal. **Nutlets** obovoid, reticulate-rugose, attached by an oblique or lateral areole which extends beyond middle. $x = 8, 10, 13$ (9, 17) (aneuploids, polyploidy).

Species 100, widely distributed over the temperate and warmer regions of the world, mainly in the northern hemisphere; 3 in sthn Afr.: the northern provinces, Swaziland, KwaZulu-Natal, Eastern Cape and all along the coast to Bredasdorp (S Western Cape).

Thorncroftia N.E.Br. 7367010

Brown: 281 (1912); Codd: 237 (1985).

Perennial herbs or soft shrubs, semisucculent. **Leaves** often crowded on short shoots, usually sparingly toothed in upper half. **Inflorescences** terminal on main and lateral branches; flowers solitary in axils of persistent bracts; bracts semisucculent, not sharply differentiated from leaves, becoming progressively smaller towards apex of inflorescence. **Calyx** bilabiate, 5-toothed; tube campanulate; upper tooth larger than lower 4, ovate-lanceolate to broadly ovate; lower 4 teeth subequal, narrowly deltoid, acuminate. **Corolla** bilabiate, 4-lobed; tube campanulate to long-cylindric; upper lip erect, oblong, emarginate; lower lip concave, spreading to reflexed; lateral lobes strap-shaped, spreading on each side of lower lip. **Stamens** 4, didynamous, declinate, arising at throat of corolla tube; filaments free to base; anthers 1-thecous. **Disc** small, swollen into a gland in front. **Style** bifid. **Nutlets** ellipsoid.

Species 3, endemic in Northern Province and Mpumalanga.

Tinnea Kotschy & Peyr. 7213000

Kotschy & Peyritsch: 25 (1867); Bentham: 1220 (1876); Briquet: 214 (1895); Baker: 496 (1900); Skan: 383 (1910); Launert & Schreiber: 31 (1969); Codd: 13 (1985).

Perennial herbs or shrubs. **Leaves** opposite or occasionally ternate or subopposite, usually entire or nearly so. **Inflorescences** usually terminal with flowers produced in 2-(or 3)-flowered verticils or in some species often solitary; flowers often scented; bracts leaf-like, becoming smaller towards apex of flowering branch. **Calyx** 2-lipped, becoming much enlarged, ovoid, inflated and 2-valved with maturity, often densely pubescent; lips entire, broadly rounded. **Corolla** 2-lipped, often liver-coloured or shades of dark reddish purple to mauve; tube short or long, cylindrical at base, widening near throat; upper lip short, broad, ascending, emarginate or 2-lobed; lower lip much larger, spreading, 3-lobed, median lobe often emarginate, larger than lateral rounded lobes. **Stamens** 4, slightly protruding, ascending under upper lip, pubescent near base; filaments of posterior pair thicker, crossing filaments of anterior stamens so that anthers are placed uppermost in throat, thickened above, thickened portion yellow and visible in corolla throat; anthers 2-thecous, anthers on shorter filaments smaller. **Ovary** divided to halfway or more; style filamentous, shortly bifid, lobes unequal. **Nutlets** obovoid-clavate, attached by a lateral areole occupying up to half the length, furnished on back with a broad elliptic or orbicular 'wing' made up of stiff primary rays interlaced with fine transverse hairs. $x = 8$ (1 report) (polyploidy).

Species 19, Africa; 4 in sthn Afr.: 2 species in the northern parts of Namibia and Botswana, 2 species from Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Vitex L. 7186000

Linnaeus: 635 (1753); Linnaeus: 285 (1754); Baker: 315 (1900); Pieper: 1 (1928); Phillips: 639 (1951); Verdcourt: 50 (1992); Bredenkamp & Botha: 611 (1993); Bredenkamp & Botha: 141 (1996).

Trees or shrubs, usually with depressed, sessile glands on leaves and flowers. **Leaves** opposite or rarely in whorls of 3, digitately compound with 3–5(7) leaflets, mostly petiolate; leaflets entire, toothed or lobed. **Flowers** regular or irregular, in many-flowered terminal racemes or axillary, determinate compound dichasia; bracts small, rarely exceeding calyx. **Calyx** persistent, accrescent, 5-lobed; tube campanulate; lobes often reduced. **Corolla** bilabiate, with tube white, lips mauve, with yellow markings at base; tube cylindric or narrowly campanulate or funnel-shaped, often curved and hairy externally as well as internally, upper lip 2-fid, the lower 3-fid. **Stamens** 4, arising at middle of corolla tube, didynamous, usually exserted; filaments thick, glandular, hairy at base; anthers dorsifixed, divergent, extrorse. **Ovary** thick-walled; style terete, bifid, usually exserted. **Fruit** a 4-loculed drupe, sessile on a firm, crateriform calyx, or a nut enveloped by an infundibular chartaceous calyx. $x = 8$ (6, 13, 17) (polyploidy).

Species 250, in tropical to temperate regions of the world; 8 in sthn Afr.: N Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

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Lauraceae

(Magnoliidae—Magnoliales)

Compiled by M. Jordaan

Mostly evergreen trees or shrubs, often tall with buttresses, or twining parasitic herbs (*Cassytha*); bark and foliage usually aromatic; plants sometimes dioecious. **Leaves** simple, alternate, rarely opposite or subopposite, entire or slightly undulate, usually coriaceous, penninerved or digitately 3–5-nerved, with a very fine reticulum of tertiary veins, scale-like in *Cassytha*; stipules 0. **Inflorescences** cymose, racemose, capitate or false umbels; rarely flowers solitary, axillary or subterminal, rarely terminal; bracts small or 0, caducous or subpersistent and sometimes forming an involucre below the partial inflorescence; bracteoles present in *Cassytha*. **Flowers** bisexual or unisexual, or sometimes bisexual and unisexual mixed, regular, generally 3-merous, usually many, small and inconspicuous, mostly green or yellow. **Perianth** generally 3-merous; tube ovoid, turbinate or campanulate, sometimes enlarged and persistent in fruit. **Tepals** usually ± equal, free, in 2 whorls of (2)3, imbricate or in 1 whorl; sometimes 0. **Stamens** and staminodes together usually twice as many as tepals, in 3 or 4 whorls, 1 or 2 outer whorls usually adnate to perianth, and innermost row often of staminodes adnate to receptacle; filaments variable, often with gland at base; anthers basifixed, with 2–4 thecae opening by valves, those of outer stamens introrse, those of third series often extrorse, sometimes with operculum remaining attached to anthers; staminodes tepaloid, sagittate or ligulate. **Ovary** superior, rarely inferior, unicarpellate, sessile, ± surrounded or enclosed by receptacle, 1-locular; ovule solitary, pendulous, anatropous; style terminal, simple; stigma small, discoid, rarely 2- or 3-lobed. **Fruit** a 1-seeded berry, drupe or sometimes dry, indehiscent, free or ± surrounded by accrescent receptacle, or completely enclosed within it, often borne on a thickened fruiting pedicel. **Seed** with membraneous to coriaceous testa, sometimes adnate to pericarp and indistinct; endosperm lacking; embryo straight; cotyledons large, fleshy.

Genera ± 52; species over 2 000, mainly in tropics and subtropics of both hemispheres; sthn Afr.: genera 5 (1 exotic), species ± 11 (1 exotic).

Jussieu: 80 (1789), as Lauri; Meisner: 1 (1864); Bentham: 146 (1880); Pax: 106 (1889); Kostermans: 73 (1938); Kostermans: 193 (1957); Rohwer: 366 (1993); Verdcourt: 1 (1996); Diniz: 45 (1997).

Key to genera

1a Parasitic, twining herbs with yellowish, thread-like stems and scale-like leaves; anthers 2-valved ..... **Cassytha**
1b Trees or shrubs with well developed leaves; anthers 2- or 4-valved:
  2a Flowers usually unisexual; anthers 4-valved; fruit seated on or in the enlarged, cupular receptacle:
    3a Leaves usually with some pits on underside in the axils of the lowest 1 or 2 pairs of nerves..... **Ocotea**
    3b Leaves without pits in the axils of the lowest nerves..... ***Litsea**
  2b Flowers bisexual; anthers 2-valved:
    4a Fruit not enclosed in receptacle; leaves opposite..... **Dahlgrenodendron**
    4b Fruit completely enclosed in the persistent, enlarged receptacle; leaves mostly alternate..... **Cryptocarya**

Cassytha L. 2825000

Linnaeus: 35 (1753); Linnaeus: 22 (1754); Jussieu: 143 (1789); Brown: 403 (1810); Reichenbach: 87 (1828); Dumortier: 16 (1829); Nees: 69 (1831); Lindley: 202 (1836); Nees: 27 (1836); Endlicher: 323 (1837); Meisner: 252 (1864); Bentham: 164 (1880); Pax: 124 (1889); Stapf: 188 (1909); Stapf: 500 (1912); Friedrich-Holzhammer: 1 (1968); Weber: 187 (1981); Van der Werff: 384 (1991); Rohwer: 386 (1993); Verdcourt: 14 (1996); Diniz: 46 (1997).

Parasitic herbs with extensively twining thread-like, yellowish stems, adhering to their hosts by uniseriate haustoria; some chlorophyll present. **Leaves** alternate, minute and scale-like. **Inflorescences** usually spicate or racemose, rarely with an additional order of branching, rarely condensed to a head. **Flowers** bisexual, 3-merous, bracteolate, sessile or pedicellate, sometimes dimorphic, small. **Perianth**: tube (receptacle) short, at first shallow, after anthesis becoming deeply urceolate. **Tepals** in 2 rows of 3, extremely unequal, the outer ones (sepaloid) much smaller, resembling bracts usually subtending

flower. **Stamens** (6–)9, fertile, those of first and second whorls without glands and with introrse 2-thecous anthers or second whorl reduced to staminodes; third whorl with subsessile glands on each side at base of filaments and anthers extrorse; a fourth whorl of subsessile or stipitate staminodes present. **Ovary** gradually enveloped by perianth tube; style cylindrical; stigma small, capitate, subsessile. **Fruit** subglobose, tightly enclosed in an accrescent perianth tube, forming a false drupe, often crowned by a persistent tepals. **Seed** subglobose; testa thin; endocarp woody. x = 12 (polyploidy).

Species 17, 14 in Australia and 3 in Africa; *Cassytha filiformis* L., a very variable species, is pantropical and very widespread, including sthn Afr.; 1 or 2 further species may occur in sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Cryptocarya R.Br. 2813000

Brown: 402 (1810); Nees: 192, 205 (1836); Endlicher: 318 (1837); Meisner: 68 (1864); Baillon: 472 (1870); Bentham: 150 (1880); Pax: 122 (1889); Stapf: 172 (1909); Stapf: 494 (1912); Kostermans: 91 (1938); Van der Werff: 384 (1991); Rohwer: 386 (1993); Verdcourt: 7 (1996); Diniz: 49 (1997).

Trees or shrubs. **Leaves** alternate, rarely subopposite, coriaceous, usually elliptic, sometimes linear, pinnately nerved or digitately 3-nerved from near or at base. **Inflorescences** subterminal or axillary, thyrso-paniculate. **Flowers** bisexual, 3-merous, rarely solitary. **Perianth**: tube ovoid, turbinate or subcylindrical, accrescent and constricted above after flowering. **Tepals** in 2 whorls of 3, subequal, deciduous. **Stamens** 9, fertile, in 3 whorls, those of outer 2 whorls with introrse anthers, of third whorl arising on upper part of perianth tube and with extrorse anthers and filaments with 2 sessile or stipitate glands; filaments usually shorter than anthers; anthers all 2-thecous; staminodes of whorl four conspicuous, often ± sagittate. **Ovary** sessile, enclosed in tube; style cylindrical, included or shortly exserted; stigma slightly expanded. **Fruit** globose or subcylindrical, entirely enclosed in the enlarged hardened or fleshy perianth tube, with minute orifice at apex, smooth or longitudinally ribbed; pericarp hard or membranous. **Seed** globose; testa membranous, not or hardly separable from pericarp. x = 12.

Species ± 350, pantropical, centred in Indo-Malayan area with few in Australia and Africa; 7 in sthn Afr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Dahlgrenodendron J.J.M.van der Merwe & A.E.van Wyk 2813010

Van der Merwe & Van Wyk: 80 (1988); Kostermans: 35 (1990) in part; Rohwer: 386 (1993).

Beilschmiedia Nees: 61, 69 (1831) in part; Ross: 118 (1973).

Tall evergreen trees. **Leaves** opposite, penninerved, net-veining conspicuous on both surfaces. **Inflorescences** 3-flowered cymules, arranged on young growth or on short-shoots, with small, caducous bracts. **Flowers** bisexual, 3-merous, greenish white. **Perianth**: tube deeply urceolate. **Tepals** subequal. **Male flowers** with 9 fertile stamens, the third whorl with glands; filaments much shorter than anthers; anthers 2-thecous, the first and second whorl introrse, the third whorl extrorse; pollen with a well developed, striate exine (apparently unique for the family); staminodes of whorl four conspicuous, ovate-triangular. **Ovary** sessile, ± immersed in receptacle, narrowed into slender style and small stigma. **Fruit** completely enclosed in accrescent perianth tube; tepals persistent. **Seed** with delicate testa.

Monotypic: *Dahlgrenodendron natalense* (J.H.Ross) J.J.M.van der Merwe & A.E.van Wyk, sthn Afr., forest in KwaZulu-Natal.

***Litsea** Lam. 2798000

Lamarck: 574 (1792) name conserved; Meisner: 220 (1864); Bentham: 161 (1880); Pax: 119 (1889); Hooker: 155 (1890); Kostermans: 240 (1957); Van der Werff: 385 (1991); Rohwer: 388 (1993).

Small trees or shrubs. **Leaves** alternate to opposite or rarely subverticillate, penninerved, glabrous, often aromatic. **Inflorescences** axillary, consisting of false umbels with up to ± 15 flowers arranged in (sometimes condensed) racemes, before anthesis with an involucre of decussate, usually persistent bracts, appearing with or before new leaves. **Flowers** unisexual, 3-merous. **Perianth**: tube almost flat to deeply cup-shaped, persistent and enlarged as a ± developed fruit cup on a usually not enlarged pedicel. **Tepals** 0–9, equal or unequal, yellow, green, or white, glabrous, often caducous during anthesis. **Male flowers** with 5–20 fertile stamens, several inner ones with glands (irregularly 3-merous flowers with 9 stamens, the third whorl with 2 glands); filaments usually longer than anthers; anthers 4-locular, all introrse or basal pair of third staminal whorl lateral; staminodes usually 0; pistillode well developed to 0; receptacle small and flat. **Female flowers** with 9–12 staminodes. **Ovary** globose or ovoid; style thick; stigma dilate. **Fruit** a red drupe, globose-ovoid or subcylindrical, seated in a ± developed cup or disc; tepals usually deciduous. x = 12 (polyploidy).

Species ± 400, Asia with fewer in Australia and the Pacific Islands, a few in North and South America, none native in Africa or Europe; 1 in sthn Afr.: **Litsea sebifera* Pers., introduced from Asia into N KwaZulu-Natal and now naturalised on forest margins.

Ocotea Aubl. 2788000

Aublet: 780, t. 310 (1775); Jussieu: 80 (1789); Nees: 25, 354 (1836); Endlicher: 321 (1837); Baillon: 476 (1870); Bentham: 157 (1880); Stapf: 186 (1909); Stapf: 498 (1912); Kostermans: 73 (1938); Rohwer: 3 (1986); Van der Werff: 385 (1991); Rohwer: 382 (1993); Verdcourt: 9 (1996); Diniz: 56 (1997).

Evergreen trees or shrubs; plants usually dioecious or polygamous. **Leaves** alternate, rarely crowded at tips of branchlets, penninerved, rarely subtriplinerved; membranous or coriaceous, glabrous, usually with pits on underside in axils of lowest 1 or 2 pairs of nerves. **Inflorescences** thyrso-paniculate to (pleio-)botryoid, axillary or subterminal. **Flowers** bisexual, 3-merous, small. **Perianth** with or without a tube. **Tepals** 6 or 8, equal, usually deciduous. **Bisexual flowers** with stamens in 3 or 4 whorls, outer 3 fertile, inner, if present, reduced to staminodes; filaments very short or lacking, those of innermost whorl with a pair of large, sessile glands at base, longer than anthers to 0; anthers 4-thecous, introrse in 2 outer whorls, ± extrorse in third whorl; ovary ovoid, ellipsoid or subglobose, usually glabrous; style longer or shorter than ovary; stigma sometimes 2-lobed. **Male flowers** similar but ovary sterile, stalk-like or lacking. **Female flowers** as in bisexual flowers but stamens rudimentary, barren. **Fruit** baccate, ellipsoid or globose, seated on or in an enlarged, cupular receptacle which is either truncate or 6-toothed or 6-lobed from persistent tepals. x = 12 (11).

Species ± 300, mostly in tropical and subtropical America, ± 30 in Madagascar, 7 in Africa, and 1 in the Canary Islands; 2 in sthn Afr., Northern Province, Mpumalanga, KwaZulu-Natal, Western and Eastern Cape; *Ocotea bullata* (Burch.) E.Mey. is Cape Stinkwood.

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Lecythidaceae

(Dilleniidae—Lecythidales)

Compiled by C.L. Bredenkamp

Trees (mangroves). **Leaves** alternate, simple, bunched at ends of branches, sometimes with large glands on margin, glabrous; stipules small. **Flowers** bisexual, regular, ± showy, in racemes. **Calyx** 2–4-lobed, leathery; tube obconical, ± quadrangular; lobes valvate or slightly imbricate, unequal, elliptic. **Petals** 4, adnate to staminal tube, free. **Stamens** very many, in several series; filaments united at base; anthers 2-thecous, usually basifixed, opening by longitudinal slits. **Ovary** inferior or semi-inferior, 2–4-locular, with 2–many axile ovules in each locule; style simple, longer than stamens; stigma truncate. **Fruit** fleshy, becoming spongy, crowned with persistent calyx, 1-seeded. $x = 13$ (polyploidy).

Genera 20, species 280, a pantropical family segregated into 4 or 5 subfamilies; *Barringtonia* is in subfamily Planchonioideae; in sthn Afr.: 1 genus, 1 species.

Sonder: 523 (1862); Sangai: 1 (1971); Fernandes: 216 (1978); Tsou: 1 (1994).

Barringtonia J.R.Forst. & G.Forst. 5506000

Forster & Forster: t. 28 (1776) name conserved; Sonder: 523 (1862); Fernandes: 216 (1978); Tsou: 64 (1994).

Description as for family.

Species 110, mostly East Indies, rare in Africa and Australia; 1 in sthn Afr.: *Barringtonia racemosa* (L.) Spreng., KwaZulu-Natal, watercourses near coast.

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Lentibulariaceae

(Asteridae—Scrophulariales)

Compiled by S.J. Smithies

Carnivorous, perennial or annual herbs, aquatic or terrestrial in wet places, with specialised organs (traps) for catching small organisms; distinction between roots, stems, leaves and traps are not always clear; rootless but often with rhizoids; stems short or 0 but stolons often present. **Leaves** rosulate or scattered on stolons, entire or much divided, sometimes heteromorphic; stipules 0. **Flowers** bisexual, irregular, usually in terminal or axillary, bracteate racemes, rarely solitary; lowest bracts usually barren; bracteoles 2, normally at base of pedicels, or 0. **Calyx** 5-partite or ± 2-cleft, almost regular or ± bilabiate, persistent and often accrescent. **Corolla** gamopetalous, bilabiate, 5-lobed; tube very short or 0; upper lip erect, interior in bud; lower lip spurred or rarely saccate at base, usually with a raised, ± gibbous palate; limb spreading or deflexed. **Stamens** 2, anterior, arising from base of corolla; filaments usually short

and curved; anthers dorsifixed, bithecate, thecae diverging, usually ± confluent, dehiscing longitudinally by a common slit; staminodes 0. **Nectary/disc** 0. **Ovary** superior, bicarpellate but unilocular; placenta free-basal, usually ovoid or globose; ovules usually many, sessile and closely packed, rarely single, anatropous, unitegmic; style simple and very short or 0; stigma ± distinctly 2-lipped, with upper lip usually smaller or ± 0. **Fruit** a capsule, dehiscing variously, often in circumscissile manner, very rarely 1-seeded and indehiscent. **Seeds** very small; testa reticulate; embryo undifferentiated; endosperm 0.

Genera 3, species ± 245; cosmopolitan; sthn Afr.: genera 2, species ± 19.

Stapf: 423 (1904); Schreiber: 1 (1968); Taylor: 9 (1988); Taylor: 1 (1989); Mabberley: 401 (1997).

Key to genera

Calyx 5-partite; traps tubular, with 2 spirally-twisted arms ..... **Genlisea**
Calyx 2-partite; traps bladder-like, ovoid or globose ..... **Utricularia**

Genlisea A.St.-Hil. 7899000

Saint-Hilaire: 428 (1833); Stapf: 436 (1904); Taylor: 38 (1988); Cook: 115 (1990); Reut: 101 (1993).

Annual or perhaps perennial herbs; rootless but with root-like appendages; stem short, erect. **Leaves** heteromorphic: foliage leaves in basal rosette, ascending, petiolate, spathulate to suborbicular, entire, persistent at time of flowering; pitcher leaves (traps) descending into substrate, consisting of stalk ending in a flask-like trap with a tubular mouth and 2 long, ribbon-like, spirally twisted arms, arms and tube with transverse bands of stiff, reversed hairs on inner side. **Flowers** in terminal, peduncled, bracteate racemes; bracteoles 2, at base of pedicels. **Calyx** longer than corolla tube, slightly accrescent, with shallow tube and 5 longer, ± lanceolate lobes. **Corolla**: upper lip ovate, entire or 2-lobed, smaller of the two; lower lip spurred at base, palate raised, ± 2-gibbous, margin 3-lobed. **Stamens** 2; filaments curved and flattened, not much longer than ellipsoid anthers; thecae subdistinct. **Ovary** ± globose, with many ovules sessile on a fleshy placenta; style short, indistinct; stigma unequally 2-lipped. **Fruit** a capsule, globose to broadly ovoid, circumscissile along equator and sometimes tropics. **Seeds** many, ovoid with prominent hilum at one end; testa reticulate.

Species ± 19, tropical America, tropical Afr.; 1 in sthn Afr.: *Genlisea hispidula* Stapf; ± eastern half of sthn Afr. from near Pietersburg (Northern Province) to Port St Johns (Eastern Cape), plus Swaziland; in seasonally or permanently wet grassland.

Utricularia L. 7901000

Linnaeus: 18 (1753); Stapf: 423 (1904); Lloyd: 75, t. 7–10 (1936); Taylor: 1 (1964); Schreiber: 1 (1968); Taylor: 9 (1988); Taylor: 1 (1989); Cook: 115 (1990).

Perennial or annual herbs; stem generally reduced or absent; stolons forming framework of plant, radiating from peduncle base and usually ramifying, at nodes bearing leaves and sometimes rhizoids, inflorescences and bladder-like traps. **Leaves** arising from various parts of plant, solitary or forming rosettes; those of terrestrial species mostly ± petiolate, narrowly linear to obovate, often decayed before flowering; those of aquatic species divided into filiform or capillary segments; traps (utricles) found on some or all vegetative organs, globose or ovoid, with trap door or mouth and wide variety of external appendages, mostly near mouth; inside of trap glandular. **Flowers** bracteate, sometimes bracteolate, in pedunculate racemes, rarely reduced to single flowers; held sometimes above water by whorl of inflated leaves; peduncle erect or twining. **Calyx** longer than corolla tube, 2-partite, generally accrescent, upper lobe usually entire, lower ± bifid. **Corolla**: tube ± 0; upper lip entire, 2(3)-lobed, with basal sac housing sex organs; lower lip usually much larger, spurred or rarely saccate at base, usually with vaulted, much-raised and 2- or 3-gibbous palate; limb entire, emarginate, 2- or 3-lobed. **Stamens** 2, arising at junction of 2 corolla lips; filaments generally short, fleshy, flattened and incurved; thecae ± distinct to confluent. **Ovary** globose or ovoid; style usually short, thick and persistent, often accrescent; stigma often unequally 2-lobed. **Fruit** a capsule, generally globose or ovoid, latter often somewhat compressed, dehiscing variously, including breaking into 2 valves and splitting in circumscissile manner, rarely indehiscent. **Seeds** usually very small, subglobose or ovoid to cylindrical, sometimes ± angular from mutual compression, closely packed to overlapping on placenta. $x = 6, 7, 8, 11$ (aneuploids, high polyploidy).

Species ± 180; cosmopolitan, mainly tropical and subtropical; 18 in sthn Afr., widespread, in water and in wet areas.

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Linaceae

(Rosidae—Linales)

Compiled by C.L. Bredenkamp

Herbs or undershrubs, rarely shrublets or small trees. **Leaves** alternate or opposite, rarely whorled, simple, entire; stipules gland-like or interpetiolar or 0. **Flowers** regular, bisexual, in panicles or cymes. **Calyx** 4- or 5-partite or se-

pals free, imbricate, persistent. **Petals** as many as sepals, contorted, free, tapering to base, often clawed, with claw naked or crested, short-lived. **Stamens** 5 or 5 + 5, alternating with petals, sometimes with alternating staminodes; filaments connate at base; anthers 2-thecous, opening inwards. **Ovary** superior, 3–5-locular, with 2 axile ovules in each locule; styles 3–5, free, rarely somewhat connate; stigmas subcapitate. **Fruit** a globose, septicidal capsule, or drupe, incompletely 5–10-locular with 1 seed per locule. **Seeds** compressed.

Genera 15, species ± 300, fairly cosmopolitan; sthn Afr.: genera 2, species 15.

Sonder: 308 (1860); Robson: 91 (1963).

Key to genera

Stamens 5; fruit capsular; annual or perennial herbs, rarely shrublets ..... **Linum**
Stamens 10, all fertile; fruit drupaceous; woody plants ..... **Hugonia**

Hugonia L. 3947000

Linnaeus: 675 (1753); Robson: 91 (1963); Robson & Gonçalves: 4 (1969).

Small trees, shrubs, lianes with recurved woody tendrils (usually in subopposite pairs), or rarely shrublets. **Leaves** petiolate, alternate, entire, crenate or toothed, sometimes with domatia in the nerve axils and with densely reticulate, tertiary venation; stipules pinnatifid or palmatifid, often caducous. **Flowers** solitary, in pairs or in few-flowered cymes, axillary or occasionally terminal, often trimorphically heterostylous. **Sepals** 5, usually unequal, persistent. **Petals** 5, shortly clawed, usually yellow. **Stamens** 5 + 5, all fertile, with filaments united into basal cup. **Ovary** 4–10-locular, alternate ones sterile; styles 2–5, free or rarely partly united; stigmas capitate, grooved. **Fruit** a drupe, with 3–5 or fewer seeds; not more than 1 per locule. **Seeds** smooth, flattened, endospermic. $x = 6$ (polyploidy).

Species 35, mainly in Old World tropics; 1 in sthn Afr.: *Hugonia orientalis* Engl., Mpumalanga (Lowveld).

Linum L. 3945000

Linnaeus: 277 (1753); Sonder: 309 (1860); Robson: 96 (1963); Rogers: 711 (1981).

Perennial herbs or undershrubs, glabrous or pubescent. **Leaves** alternate, opposite or sometimes whorled, sessile; stipular glands present or 0. **Flowers** shortpedicelled in an open or condensed terminal racemose or paniculate scorpioid cyme, homostylous or 2 species distylous, perfect. **Sepals** 5, imbricate, outer occasionally entire or sparsely serrate or, more frequently, all with marginal glandular teeth. **Petals** 5, separate, convolute, yellow, frequently reddish-tinged in bud, short-lived. **Stamens** 5, united basally, with or without diminutive intervening staminodia. **Ovary** 5-carpellate, becoming partially 10-locular as a result of intrusion of false partitions. **Styles** 5, separate or united, sometimes nearly to summit; stigmas capitate. **Fruit** an ovate capsule, dehiscing into 10 1-seeded segments. **Seeds** shining, reddish brown. $x = 9$, 10 (7, 8) (aneuploids, polyploidy, B-chromosomes).

Species ± 230, cosmopolitan in temperate and subtropical regions; 14 in sthn Afr., all belonging to the section *Linopsis*, which ranges broadly from the Mediterranean region to sthn Afr. and to both North and South America; 13 species endemic to the Western and Eastern Cape. *Linum thunbergii* Eckl. & Zeyh. in Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

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Loasaceae

(Dilleniidae—Violales)

Compiled by C.L. Bredenkamp

Subshrubs, scabrous, covered with brittle hairs armed with minute recurved barbs. **Leaves** alternate, petiolate, slightly or deeply lobed; stipules 0. **Inflorescence** a scorpioid, bracteate cyme. **Flowers** bisexual, regular. **Calyx**: tube obconic, 10-ribbed, adnate to ovary, densely villous; lobes 5, equal, longer than tube, oblong-spathulate, persistent, enlarged in fruit. **Petals** 4 or 5, free, arising in throat of calyx tube, induplicate-valvate, shorter than calyx tube, concave, hairy without. **Nectary scales** 5, petaloid, cucullate, alternating with petals. **Stamens** many, inserted with the petals, some of outer stamens with a hairy scale at base and with or without anthers; filaments linear, all or mostly beaded; anthers 2-thecous, opening by longitudinal slits. **Ovary** inferior, 2- or 3-locular, with 1 or rarely 2 apical pendulous ovules in each locule; portion of ovary projecting above calyx tube flattened and densely villous; style simple, somewhat angled; stigma simple. **Fruit** woody, ribbed, 2- or 3-locular, 1–3-seeded, indehiscent, crowned with enlarged calyx lobes, densely villous. **Seed** compressed; cotyledons flat, thick, fleshy, oblong; endosperm 0. $x = 12$.

Genera 15, species ± 260; 14 genera and all but 2 species are natives of tropical and South America, the remaining genus, *Kissenia*, in Africa and the Arabian Peninsula; sthn Afr.: genus 1, species 1.

Harvey: 502 (1862); Codd: 134 (1976).

Kissenia R.Br. ex Endl. 5388000

Endlicher: 76 (1842); Anderson: 43 (1861); Harvey: 502 (1862); Dandy: 451 (1967); Codd: 134 (1976).

Description as for family.

Species 2, 1 in Somalia and the S Arabian Peninsula; 1 in sthn Afr.: *Kissenia capensis* Endl., Namibia and Northern Cape.

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Lobeliaceae

(Asteridae—Asterales)

Compiled by W.G. Welman

Herbs, undershrubs, rarely entirely woody; often with sparse milky juice. **Leaves** alternate, sometimes radical, opposite or whorled, simple; stipules 0. **Flowers** bisexual, rarely unisexual by abortion, irregular, solitary and axillary, or in spikes or racemes. **Calyx** 5-lobed, adnate to ovary. **Corolla** united, 1- or 2-lipped; lips reversed by a twisting of the pedicel; lobes 5, valvate. **Stamens** 5, alternate with corolla lobes; filaments free or arising on base of corolla; anthers cohering into a tube around style or rarely free (*Cyphia*). **Ovary** ± inferior, 2-locular, rarely imperfectly divided; ovules 1–many, axile; style simple or 2-lobed, with ring of hairs. **Fruit** capsular and variably dehiscent. **Seeds** 1–many, albuminous; embryo straight.

Genera ± 30, species ± 1000; cosmopolitan but mainly tropics and subtropics of the New World; sthn Afr.: 5 genera, ± 134 species. Lobeliaceae (incl. Cyphiaceae) sometimes classified under Campanulaceae in broad sense.

Sonder: 530 (1865) under Campanulaceae; Thulin: 116 (1983).

Key to genera

1a Anthers free or apically loosely united ..... **Cyphia**
1b Anthers united into a tube:
  2a Ovary 1-locular; capsule prismatic, elongate, 3-valved ..... **Grammatotheca**
  2b Ovary 2-locular:
    3a Corolla tube cleft down one side to base:
      4a Lobes of stigma short, subrotund or oval ..... **Lobelia**
      4b Lobes of stigma filiform, elongate ..... **Monopsis**
    3b Corolla tube funnel-shaped, not cleft ..... **Wimmerella**

Cyphia P.J.Bergius 8681000

Bergius: 172 (1767); Phillips: 449 (1917); Wimmer: 935 (1968).

Perennial herbs, often with tuberous rootstock, erect or twining. **Leaves** radical or cauline, alternate, entire, toothed or divided, varying from broadly ovate to narrowly linear. **Flowers** variously arranged; bracts subulate to lanceolate, entire or divided, with 2 bracteoles variously situated on pedicels. **Calyx** shorter than corolla tube; segments linear-lanceolate to ovate, sometimes toothed or lobed. **Corolla** usually bilabiate, unequally 5-lobed, usually with 3 petals cohering and 2 free, rarely all free. **Stamens** free from petals; filaments free or sometimes connate into a hairy tube; anthers free or apically loosely united, oblong or lanceolate, usually hairy on back, rarely glabrous. **Ovary** partly inferior, with few to many ovules in each locule, dependent from apical placentas; style terete, sometimes stout, free or enclosed in staminal tube when present; stigma variable, usually somewhat club-shaped. **Fruit** an ellipsoid or globose capsule, ribbed and sometimes tubercled between ribs. **Seeds** discoid and winged or 3-angled, with reticulate testa. $x = 9$.

Species over 60, Africa; ± 35 in sthn Afr., all regions, absent in Namibia, rare in Botswana.

Grammatotheca C.Presl 8696000

Presl: 43 (1836); Wimmer: 695 (1953).

Herbs favouring wet places. **Leaves** sessile, linear to lanceolate. **Flowers** solitary, sessile, axillary. **Calyx**: segments linear, spreading or reflexed. **Corolla** bilabiate, 5-lobed, glabrous; tube cylindric, split down one side almost to base; upper lip of 2 linear, acuminate lobes; lower lip of 3 oblong lobes. **Stamens** arising from base of corolla tube; filaments connate into a tube; anthers cohering, bearded. **Ovary** cylindric, elongate, with many ovules on axile placentas; style linear, glabrous; stigma subglobose, slightly bifid, glandular-hairy. **Capsule** 1-celled, 3-valved, linear, triquetrous. **Seeds** many, ovoid.

Species 1, sthn Afr., also recorded from Australia: *Grammatotheca bergiana* (Cham.) C.Presl, KwaZulu-Natal, Western and Eastern Cape.

Lobelia L. 8694000

Linnaeus: 929 (1753); Wimmer: 408, 775 (1953); Wimmer: 855 (1968).

Annual or perennial herbs or subshrubs; sometimes wiry and/or appearing leafless. **Leaves** alternate, opposite or whorled, variable, sometimes radical. **Flowers** in leafy spikes or racemes, or axillary and solitary, or clustered at ends of branches. **Calyx** much shorter than corolla tube, rarely oblique; lobes often ciliate, sometimes scabrid. **Corolla** cleft down one side to base, 5-lobed, regular or (1)2-lipped, rarely with palate on one lip, rarely with pouch at base; upper lip 3-lobed or of 2 distinct, clawed petals; lower lip 2- or 3-fid. **Stamens** attached to base of corolla, rarely higher up; filaments usually cohering, some or all bearded. **Ovary** inferior to superior, 2-locular, with 1–many ovules in each locule, on axile placentas; style linear, rarely with hairy collar below stigma; stigma subglobose, 2-lobed, hairy. **Fruit** a cap-

sule, 2-valved, often crowned with persistent calyx. **Seeds** usually many. x = 7 (6, 8) (B-chromosomes, aneuploids, polyploidy).

Species ± 300, cosmopolitan, mostly tropics and subtropics; ± 70 in sthn Afr., all regions.

Monopsis Salisb. 8695000

Salisbury: 37 (1817); Wimmer: 698, 783 (1953); Thulin: 145 (1983).

Small, annual or perennial herbs, diffusely branched. **Leaves** opposite or alternate. **Flowers** solitary, axillary, pedicellate or sometimes in terminal racemes or spikes. **Calyx** obconic or hemispherical, with tube adnate to ovary; lobes ± equal. **Corolla** cleft down one side nearly to base; limb bilabiate or subregular; upper lip 3-fid, lower nearly entire or divided nearly to base. **Stamens** free from corolla tube or arising from near its base; filaments ± united above; anthers cohering, bearded. **Ovary** inferior, many-ovuled; style filiform, bent, divided into 2 filiform, elongate stigmas with hairs at their base. **Capsule** 2-valved, dehiscing loculicidally. **Seeds** many, usually reticulate. x = 7 (1 report).

Species ± 20, Africa; 18 in sthn Afr., all regions; *Monopsis simplex* (L.) E.Wimm. said to be naturalised in Australia.

Wimmerella L.Serra, M.B.Crespo & Lammers 8699010

Serra *et al.*: 415 (1999).

Laurentia Mich. ex Adans.: 135 (1763) in part.

Small, often delicate herbs, sometimes creeping; usually in moist places. **Leaves** sometimes radical, sessile or petioled, variable. **Flowers** solitary and axillary or sometimes in racemes. **Calyx** shorter than corolla tube, glabrous or hairy. **Corolla** 5-lobed or bilabiate, glabrous; tube funnel-shaped or cylindric; upper lip of 2 linear lobes; lower lip of 3 oblong lobes, when 5-lobed then all lobes oblong-linear and sometimes unequal. **Stamens** arising from base of corolla tube; filaments connate, glabrous; anthers cohering, not bearded or 1 or more with 1 or 2 setae at apex, rarely hairy on back. **Ovary** inferior or partly superior, more or less ovoid, obconic or ellipsoid, with many ovules on axile placentas; style linear; stigma subglobose, 2-lobed, glandular-hairy. **Fruit** a capsule, crowned with persistent calyx. **Seeds** subglobose, with somewhat crustaceous testa. x = 7, 11 (1 report each) (polyploidy).

Species 10, sthn Afr., KwaZulu-Natal, Northern, Western and Eastern Cape.

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Loranthaceae

(Rosidae—Santalales)

Compiled by G. Germishuizen

Mainly shrubby, brittle, perennial aerial hemiparasites of other dicotyledons, glabrous or variously pubescent, often with swollen nodes. **Leaves** opposite, semi-opposite, alternate or whorled, simple, entire, often coriaceous, predominantly evergreen (rarely deciduous); stipules 0. **Inflorescence** a few-flowered umbel or head, or flowers 1–several in fascicles, rarely racemose. **Flowers** bisexual, regular to irregular by occurrence of a unilateral split, 5- or 4-merous, often brightly coloured with yellows and reds, mostly opening explosively, pollinated mainly by birds. **Calyx** often reduced to a low rim (a calyculus), persistent on fruit. **Petals** partly fused or ± free. **Stamens** as many as and opposite and arising on petals; anthers basifixed, usually 2-thecous, sometimes divided into many thecae by presence of numerous transverse septa. **Ovary** inferior, of 3–6 fused carpels, uni- or plurilocular, typically without distinct placenta; sometimes with disc; ovules absent, embryo sacs formed at base of ovary (mamelon); style simple; stigma mostly capitate. **Fruit** a berry, usually 1-seeded, with a viscous layer developed outside vascular bundles. **Seed** solitary, without a testa.

Genera ± 77, species ± 950; widely distributed in tropical and south temperate regions of the world; sthn Afr.: genera 13, species ± 34.

Sprague: 100 (1915); Balle: 1 (1969); Wiens & Tölken: 1 (1979); Polhill & Wiens: 77 (1998).

In the light of recent research, especially the pollination mechanism of the flowers, Wiens & Tölken (1979) subdivide the genus *Loranthus* in broad sense in sthn Afr. into 11 [13 in Polhill & Wiens (1998)] smaller genera under Loranthaceae along the lines suggested by earlier taxonomists. The genus *Viscum* is placed in Viscaceae.

Key to genera

1a Flowers 5-merous:

2a Corolla choripetalous (but the petals connivent and superficially sympetalous), buds and open flowers strongly curved or bow-shaped ..... **Plicosepalus**

2b Corolla sympetalous, forming at least a short, but more often a conspicuous basal tube, essentially straight above the often swollen base:

3a Flowers bilaterally symmetrical following anthesis (bearing a single V-shaped unilateral split which is sometimes obscured in pressed specimens):

4a Filaments following anthesis essentially erect but often curving slightly inward, ± 3 mm long; styles conspicuously tomentose in lower half ..... **Vanwykia**

4b Filaments following anthesis coiled or inflexed 90° or more, 5 mm or longer; styles essentially glabrous:

5a Style gradually thickened from above the middle and abruptly constricted into a conspicuous neck below the enlarged and rounded stigma (skittle-shaped):

6a Corolla lobes conspicuously reflexed ..... **Tapinanthus**

6b Corolla lobes erect:

7a Corolla glabrous or shortly hairy, not stellate or dendritic ..... **Agelanthus**

7b Corolla densely covered with stellate or dendritic hairs ..... **Phragmanthera**

5b Style with essentially the same diameter throughout its length (filiform):

8a Corolla lobes distal from point of filament attachment, usually much shorter or occasionally as long as the rest of the corolla; corolla tube below split (i.e. closed portion) ± 10 mm or longer:

9a Corolla tube without conspicuous basal swelling, if slightly expanded basally, then never abruptly constricted, enlarging laterally to at least 3 mm or more in diameter ..... **Agelanthus**

9b Corolla tube with conspicuous basal swelling, then abruptly and very narrowly constricted (± 0.5mm) just above swelling, thereafter, enlarging laterally to ± 1.5 mm ..... **Oncocalyx**

8b Corolla lobes distal from point of filament attachment, at least twice the length of the rest of the corolla; corolla tube below split (i.e. closed portion) ± 7 mm long or less:

10a Corolla reddish orange (mature buds black-tipped), lobes reflexed into coils; anthers typically breaking from filaments at anthesis; inflorescence primarily umbellate, but occasionally an apically crowded raceme ..... **Moquiniella**

10b Corolla greenish yellow, lobes erect to slightly reflexed, never coiled; anthers mostly persistent following anthesis; inflorescence umbellate ..... **Oncocalyx**

3b Flowers radially symmetrical following anthesis (not producing a V-shaped split):

11a Corolla bearing conspicuously long (3–5 mm), white, silky, ascending hairs; young leaves generally light to densely stellate-pubescent; inflorescence a head; anthers typically breaking from filaments at anthesis ..... **Erianthemum**

11b Corolla, leaves, and inflorescence esentially glabrous; inflorescence umbellate; anthers mostly persistent following anthesis:

12a Corolla lobe inrolled at anthesis ..... **Oliverella**

12b Corolla lobe strongly reflexed at anthesis:

13a Filaments curving gently outward to 90° following anthesis, essentially isodiametric; style broadly recurved ± 180° near apex; corolla tube expanding slightly upward, 35–40 mm long, 3–5 mm wide, greenish yellow ..... **Pedistylis**

13b Filaments tightly coiled following anthesis, coiled portion distinctly thicker and wider than rest of filament; corolla tube 15–20 mm long, 1–2 mm wide, crimson and yellow ..... **Actinanthella**

1b Flowers 4-merous (rarely 5-merous):

14a Inflorescence a raceme or spike; corolla choripetalous (but petals connivent and superficially sympetalous), glabrous, radially symmetrical ..... **Helixanthera**

14b Inflorescence a single to few-flowered, sessile umbel; corolla canescent or tomentose, sympetalous, bilaterally symmetrical (bearing a unilateral V-shaped split) ..... **Septulina**

Actinanthella Balle 2074080

Balle: 1625 (1954); Wiens & Tölken: 34 (1979); Polhill & Wiens: 99 (1998).

Aerial, hemiparasitic shrubs up to perhaps 1 m high; stems puberulent to densely pubescent. **Leaves** alternate, rarely in small fascicles, oblong-oblanceolate to elliptical, glabrous or pubescent; petioles 2–3 mm long. **Flowers** 5-merous, solitary, sessile-subsessile, 1 or 2 in axils. **Corolla** yellow-green, sometimes with red, gamopetalous, radially symmetrical (without unilateral split); tube expanding upward to at least twice the basal diameter; lobes 2 or 3 times as long as tube. **Filaments** arising slightly below midpoint of lobe, distal portion only coiled following anthesis, coiled portion ± twice as wide and thick as proximal, erect portion. **Style** filiform; stigma ovoid. **Berry** unknown.

Species 2, endemic to southeastern and sthn Afr.; without obvious close relatives; 1 in sthn Afr.: *Actinanthella wyliei* (Sprague) Wiens, found only in the Ngoya Forest Reserve in central KwaZulu-Natal.

Agelanthus Tiegh. 2074180

Van Tieghem: 246 (1895); Balle: 583 (1955); Polhill & Wiens: 137 (1998).

Tapinanthus (Blume) Rchb.f. in part, Wiens & Tölken: 3 (1979).

Aerial, hemiparasitic shrubs of varying sizes from ± 0.5–2 m or higher, glabrous to densely and variously pubescent; stems usually glabrate with age, often with swollen, floriferous nodes; haustorium with a single primary penetrating organ. **Inflorescence** usually an axillary umbel or sometimes a head, often fascicled, occasionally flowers solitary through reduction of peduncles. **Flowers** 5-merous, gamopetalous, bilaterally symmetrical by the presence of a unilateral, V-shaped split of varying length. **Corolla** with a conspicuously swollen base, or tube cylindrical; lobes erect, glabrous or variously pubescent, mostly yellow, red or combinations thereof. **Filaments** coiled or involutely curved at anthesis as result of explosive opening of flower; anthers with or without basal tooth or ledge. **Style** filiform or upper half thickened gradually from middle, then abruptly constricted into a neck below stigma. **Berry** ellipsoid, ovoid, obovoid or rounded, 8–12(–15) mm long, smooth or stellate-pubescent, pink, whitish orange, red-orange or red.

Species ± 59, in Africa and Arabian Peninsula, the largest and central genus of African Loranthaceae; ± 10 in sthn Afr., widespread.

Erianthemum Tiegh. 2074060

Van Tieghem: 247 (1895); Danser: 55 (1933); Balle: 159 (1968); Balle: 4 (1969); Wiens & Tölken: 29 (1979); Germishuizen *et al.*: 16 (1994); Polhill & Wiens: 234 (1998).

Aerial, hemiparasitic, moderate-sized to large shrubs up to 2 m high; younger stems and leaves densely brownish

to whitish stellate-pubescent. **Leaves** opposite-subopposite, sometimes crowded in fascicles on older stems. **Inflorescence** a 2–6-flowered head, axillary or terminating short spur-branches originating from leaf fascicles on older stems. **Flowers** 5-merous with conspicuous, whitish, long (3–5 mm), ascending, silky hairs. **Corolla** radially symmetrical at anthesis, without unilateral split; lobes variously reflexed at anthesis, usually longer than or equalling tube. **Filaments** arising well above base of lobes; anthers breaking from filaments with explosive opening of corolla, remaining filaments essentially erect. **Style** filiform; stigma capitate. **Berry** reddish, with long silky hairs; calyx tube persistent. $x = 9$ (1 report).

Species 16, widely distributed from central to sthn Afr.; 2 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Eastern Cape.

Helixanthera Lour. 2074100

Loureiro: 142 (1790); Danser: 55 (1933); Wiens & Tölken: 37 (1979); Polhill & Wiens: 79 (1998).

Aerial, hemiparasitic, small to moderate-sized woody or succulent shrubs up to perhaps 0.5 m high, glabrous with mostly greyish to brownish stems. **Leaves** opposite-subopposite, broad to elongate, succulent to chartaceous. **Inflorescence** a terminal or axillary raceme, 15–40 mm long, 8–40-flowered. **Flowers** 4-merous, 5–15 × 1–3 mm, whitish to reddish orange; pedicels short (1–3 mm). **Corolla** choripetalous; lobes reflexing from point where filaments arise. **Filaments** erect; anthers with or without locules. **Style** quadrangular or sometimes thickened basally. **Berry** rounded to ellipsoid, red to pink, smooth or warted. $x = 9$.

Species ± 45, with 12 species in Africa south of the Sahara and the remaining in tropical Asia; 2 in sthn Afr., Northern Province, KwaZulu-Natal.

Moquiniella Balle 2074030

Balle: 1628 (1954); Wiens & Tölken: 25 (1979) as *Moquinella*; Germishuizen & Scott:10 (1994); Polhill & Wiens: 207 (1998).

Moquinia A.Spreng.: 9 (1828); Danser: 55 (1933).

Aerial, hemiparasitic shrubs up to 1 m high, essentially glabrous. **Leaves** alternate, opposite-subopposite, occasionally fascicled, somewhat coriaceous with age, mostly obovate to elliptic-linear to lanceolate (greatly variable in size), (15–)25–40(–80) × (4–)5–10(–18) mm, rounded at apex, cuneate at base; petioles 2–5 mm long. **Inflorescence** a 3–6-flowered umbel, or occasionally racemose by the addition of several flowers lower on rachis, axillary or solitary on older branches. **Flowers** 5-merous, tubular; mature buds (25–)35–40(–45) mm long, orange or red basally, yellow above, apical portion blackish, mostly cylindrical but slightly expanded basally. **Corolla** gamopetalous, bilaterally symmetrical (tube bearing a short, V-shaped, unilateral split); lobes slightly longer than rest of corolla and spirally coiled following anthesis. **Filaments** arising near base of lobes; anthers normally breaking from filament at anthesis (flower opens explosively). **Style** filiform, up to 80 mm long, red; stigma capitate. **Berry** ellipsoid, 10–15 × 4–7 mm, reddish when mature, smooth. $x = 9$.

Monotypic: *Moquiniella rubra* (A.Spreng.) Balle, Northern, Western and Eastern Cape.

Oliverella Tiegh. 2074190

Van Tieghem: 258 (1895); Polhill & Wiens: 101 (1998).

Small, aerial, hemiparasitic shrubs, shortly hairy. **Leaves** opposite to alternate. **Inflorescence** a solitary, axillary, many-flowered umbel. **Calyx** rim-like. **Corolla** 5-merous, hairy, opening down one side; buds slightly curved, with ellipsoid apical swelling; tube green, short; lobes red, sometimes grey outside on upper part. **Filaments** arising on corolla lobes, filiform below, thickened above, inrolled; anthers 4-thecous, with small connective appendage. **Style** filiform; stigma capitate. **Berry** red, obovoid, with persistent calyx.

Species 3, eastern and south-central Africa in coastal and deciduous bushland and mixed woodland; 1 in sthn Afr.: *Oliverella rubroviridis* Tiegh., Botswana.

Oncocalyx Tiegh. 2074200

Van Tieghem: 258 (1895); Polhill & Wiens: 101 (1998).

Odontella Tiegh.: 259 (1895); Balle: 161 (1968); Balle: 4 (1969); Wiens & Tölken: 28 (1979). *Tieghemia* Balle: 1062 (1956); Wiens & Tölken: 23 (1979); Germishuizen: t. 1997 (1989).

Aerial, hemiparasitic shrubs of relatively small size, usually less than 0.5 m high, glabrous. **Stems** buff-coloured with usually dense lenticels and often greatly swollen, floriferous nodes; wood a dull pink (in living plants); haustorium expanding laterally and proximally along cambium from point of infection and enlarging with age and penetrating into xylem and erupting through cortex near shoots. **Leaves** mostly alternate, blades usually elliptic. **Inflorescence** a 2–6-flowered umbel with short peduncles and pedicels less than 2 mm long, solitary in axils or fascicled on older swollen nodes. **Flowers** 5-merous, gamopetalous, bilaterally symmetrical by the presence of a unilateral, V-shaped split ± as long as erect lobes. **Calyx** cupular to tubular. **Corolla** with conspicuous basal swelling, mostly yellow sometimes bands of red, white, pink, and pale green in various combinations. **Filaments** coiled or curved at anthesis, with 2 minute (0.5 mm long) lateral appendages or teeth present 1–2 mm below anthers. **Style** filiform; stigma capitate. **Berry** red, usually ovoid, occasionally verrucose. $x = 9$.

Species ± 13, widespread mostly in the arid regions of tropical Africa; 3 in sthn Afr., Namibia, Northern Province, Mpumalanga, KwaZulu-Natal, Eastern Cape.

Pedistylis Wiens 2074070

Wiens: 421 (1978); Wiens & Tölken: 32 (1979); Germishuizen *et al.*: 6 (1994b); Polhill & Wiens: 98 (1998).

Emelianthe Danser: 54 (1933) in part.

Aerial, hemiparasitic shrubs reaching 2 m or more in height, glabrous; older plants forming much enlarged (up to 1 m across!) haustorial connections with host; younger branches often densely lenticellate, nodes of older branches usually greatly swollen. **Leaves** opposite-subopposite, mostly oblong, often slightly falcate, highly variable in length (45–)70–100(–170) × (15–)25–35(–45) mm, rounded at apex, cuneate at base, dark dull green, with a slight waxy bloom, glabrous, thick, coriaceous, penninerved, veins often raised on lower surface; petioles 7–13 mm long. **Inflorescence** a 2- or 3-flowered umbel, axillary, or often in pairs on swollen nodes of older branches; peduncles and pedicels stout, each ± 5 mm long. **Flowers** 5-merous, tubular, radially symmetrical (tube without unilateral split). **Corolla** yellow, gamopetalous, glabrous; tube expanding slightly upwards, up to 40 mm long; lobes reflexed, up to 40 mm long. **Filaments** arising at base of corolla lobes, curving out ± 90° or more at maturity, becoming reddish. **Style** up to 80 mm long, near apex bending downward in a broad curve for 180° or more (as a shepherd's crook), dark red; stigma broadly ovate, ellipsoid. **Berry** ellipsoid, 25 × 10 mm, reddish brown when mature.

Monotypic: *Pedistylis galpinii* (Schinz ex Sprague) Wiens, restricted to the lowveld of Mpumalanga and adjoining Swaziland and Mozambique. An isolated genus without apparent close relatives.

Phragmanthera Tiegh. 2074160

Van Tieghem: 261 (1895); Balle: 164 (1968); Balle: 5 (1969); Polhill & Wiens 246 (1998).

Tapinanthus (Blume) Rchb.f. in part, Wiens & Tölken: 3 (1979).

Aerial, hemiparasitic shrubs, often large and pendent; branchlets slightly compressed, often with scales or stellate-hairy on young parts. **Leaves** opposite, subopposite or rarely ternate, mostly petiolate, usually somewhat coriaceous. **Inflorescence** a sessile to shortly pedunculate umbel or 2–several, axillary. **Calyx** annular to shortly tubular, subentire to shortly lobed. **Corolla** 5(exceptionally 6)-lobed, with dense stellate or dendritic hairs, tube longer than lobes, usually yellow or orange with red markings or more often reddish, but colours muted by indumentum; apical swelling of bud fusiform to globular, sometimes ribbed or narrowly winged; basal swelling variously developed; tube split unilaterally, the V-slit extending little more or less than ± halfway, papillate along sutures; lobes erect. **Filaments** attached near base of lobes, linear, inrolled at anthesis; anthers oblong to linear-oblong, with 4-thecae transversely divided into several–many locules. **Style** slender, 5-angled or narrowly 5-winged, often expanded opposite filaments and narrowed opposite anthers, sometimes papillate or hairy; stigma globular to obovoid. **Berry** reddish, often blue to blue-green, ellipsoid or obovoid, mostly with persistent calyx.

Species ± 34, widely spread in tropical Africa and Arabian Peninsula; 4 in sthn Afr., Namibia.

Plicosepalus Tiegh. 2074090

Van Tieghem: 504 (1894); Danser: 100 (1933); Balle: 169 (1968); Balle: 7 (1969); Wiens & Tölken: 34 (1979); Polhill & Wiens: 87 (1998).

Aerial, hemiparasitic shrubs reaching 1 m or more in height, glabrous; spreading by haustoria-bearing surface runners. **Leaves** opposite-subopposite, mostly oblong to elliptical, highly coriaceous with age, shortly petiolate. **Inflorescence** an axillary, solitary or fascicled, 2–6-flowered umbel. **Flowers** 5-merous, bilaterally symmetrical, strongly curved (C- or bow-shaped), especially in older buds, base rather enlarged and bud apex strongly clavate. **Calyx** reduced to a short rim rarely over 1 mm high. **Corolla** choripetalous, but connivent and superficially appearing united at base, usually red or yellow; petals basally plicate on inner surface, lobes variously reflexing (often twisted) above point where filaments arise, remaining connivent below. **Style** filiform, inserted in a depression on ovary; stigma capitate. **Berry** ellipsoid, smooth or warty, red or yellow. $x = 9$.

Species ± 12, widespread throughout the more arid regions of Africa; 3 in sthn Afr., Namibia, Botswana, Northern Province, Swaziland, KwaZulu-Natal.

Septulina Tiegh. 2074110

Van Tieghem: 263 (1895); Balle: 177 (1968); Balle: 9 (1969); Wiens & Tölken: 39 (1979) ; Polhill & Wiens: 223 (1998).

Dendrophthoe Mart.: 109 (1830) in part. *Taxillus* Tiegh.: 256 (1895); Danser: 123 (1933) in part.

Aerial, hemiparasitic shrubs of small to moderate size, probably not higher than 0.75 m, often appearing greyish due to short, dense tomentum on stems and leaves; older stems often greyish to reddish brown. **Leaves** alternate, shortly petiolate (2–6 mm), obovate-elliptical, 10–30 × 3–20 mm. **Flowers** 4-merous, solitary, 1–3 in axils with short pedicels (1–3 mm). **Calyx** reduced to a short rim or forming a tube up to 2 mm long; bracts 2–3 mm long. **Corolla** stellate or lanate-pubescent, 25–40 mm long, with short unilateral split 5–7 mm long, outside mostly greyish green with variable shades of dull red, inside orange-reddish; lobes reflexed. **Filaments** ± erect, 4–6 mm long; anthers locellate, ± as long as filaments. **Style** essentially filiform but tapering slightly towards stigma. **Berry** mostly ellipsoid, 7–12 mm long, red. $x = 9$ (1 report).

Species 2, Namibia, Northern and Western Cape. Related to *Vanwykia* and the Madagascan genus *Bakerella* Tiegh., both of which show close affinities to the larger genus *Taxillus* Tiegh. which is widespread in tropical Asia.

Tapinanthus (Blume) Rchb.f. 2074010

Reichenbach 73 (1841); Van Tieghem: 267 (1895); Danser: 107 (1933); Balle: 181 (1968) in part; Balle: 10 (1969) in part; Stearn: 157 (1968); Wiens & Tölken: 3 (1979); Germishuizen *et al.*: 20 (1994c) ; Polhill & Wiens: 183 (1998).

Loranthus sect. *Tapinanthus* Blume: 15 (1830). *Acranthemum* Tiegh.: 255 (1895).

Aerial, hemiparasitic shrubs of varying sizes from ± 0.5–2 m or higher, glabrous to puberulous or velvety. **Leaves** mostly opposite, sessile to petiolate. **Inflorescence** 2–16 in axillary or clustered umbels at older nodes, shortly pedunculate; bract saucer-shaped to cupular. **Flowers** 5-merous. **Calyx** saucer-shaped to cupular or occasionally shortly tubular. **Corolla** with tube much longer than lobes, opening with a V-split, usually pink to purplish; basal swelling well formed; lobes attenuate to spathulate, conspicuously reflexed. **Filaments** arising near top of corolla tube, short, linear, inflexed to inrolled; anthers 4-thecous, short. **Style** swollen opposite filaments, constricted above; stigma small, obovoid to capitate. **Berry** oblong-ellipsoid to globose, often somewhat urceolate to the persistent calyx, smooth to papillose, usually ripening red. $x = 9$.

Species ± 30, tropics and subtropics of Africa; ± 4 in sthn Afr., widespread.

Vanwykia Wiens 2074050

Wiens: 422 (1978); Wiens & Tölken: 28 (1979); Germishuizen *et al.*: 2 (1994a); Polhill & Wiens: 221 (1998).

Aerial, hemiparasitic, moderate-sized to large shrubby perennial, reaching a height of perhaps 1 m or more; spreading by haustoria-bearing surface runners. **Stems** stout and robust, leaf-bearing shoots 3–5 mm thick, reddish brown, covered with thin greyish bark, peeling off in small strips; young branches densely shortly tomentose or glabrous on older branches. **Leaves** subopposite-alternate, rarely fascicled, obovate, (45–)55–66(–74) × (25–)30–40(–45) mm, rounded at apex, cuneate at base, densely yellow-white tomentose when young, becoming glabrous and thickly coriaceous when older; margins entire, thickened; petioles 4–10 mm long. **Inflorescence** a 3–6-flowered umbel, often fascicled on swollen nodes of older branches; peduncles 4–5 mm long, covered by dense yellowish white tomentum at least 1 mm thick (trichomes with whorls arising from a central axis). **Flowers** 5-merous, tubular, variable, up to 45 mm long, with short pedicels 1–2 mm long and conspicuous oblong-linear bracts 4–5 mm long. **Corolla** gamopetalous, bilaterally symmetrical (the tube bearing only a short split 4–6 mm deep), yellowish white-tomentose; lobes erect, somewhat incurved apically. **Filaments** arising at base of corolla lobes, erect, but curving inward to form a central, collective anther mass, pinkish purple at apex; anthers up to 4 mm long, orange-yellow on inside. **Style**

thickened and pubescent for half its length from below, thinner and glabrous above; stigma ellipsoid. **Berry** unknown.

Genus with 1 (possibly 2) species in eastern to southeastern Africa; 1 in sthn Afr.: *Vanwykia remota* (Baker & Sprague) Wiens, occurs in the extreme northeastern part of Kruger National Park (Northern Province).

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Lythraceae

(Rosidae—Myrtales)

Compiled by C.L. Bredenkamp

Annual or perennial herbs, undershrubs, shrubs or trees, often aquatic or semi-aquatic. **Leaves** opposite-decussate, sometimes whorled, spirally arranged or alternate, simple, entire; stipules (0)2–10 or more. **Flowers** bisexual, usually regular, homo-, di- or trimorphic, 4–6-merous, solitary (*Rotala* and *Heimia*) or variously arranged in lax or condensed, sessile or pedunculate cymes often subtended by enlarged folded bracts (*Nesaea*), or flowers in much-branched panicles (*Galpinia*). **Calyx** lobed; tube shallow, campanulate or cylindrical; lobes valvate, often with minute to long-cornate appendages alternating with lobes. **Petals** 0 or as many as calyx lobes, free, arising near or on rim of calyx tube, alternating with calyx lobes, membranous and usually caducous, narrowing towards base, often crumpled in bud, white, pink, purple, yellow or deep orange. **Stamens** arising near base of calyx tube, fewer, equal to or twice as many as calyx lobes, if twice as many then of two different lengths; anthers 2-thecous, dorsifixed. **Ovary** superior, incompletely (1)2–6-locular; ovules many, axile or on septa; style simple, sometimes very short; stigma capitate or acute (*Galpinia*). **Fruit** a capsule, dehiscence varied.

Genera 25, species 550, ± cosmopolitan, mainly in warm regions; many aquatic or marsh-loving species; sthn Afr.: 4 indigenous, 2 exotic genera, 44 species.

Schlechtendal: 346 (1827); Sonder: 514 (1862) under Lythrariae; Koehne: 241 (1903); Pohnert & Roessler: 1 (1966); Webb: 301 (1968); Fernandes: 276 (1978); Cook: 9 (1979); Fernandes: 7 (1980); Immelman: 35 (1991); Graham *et al.*: 435 (1998).

Key to genera

1a Herbs, annual or perennial:
- 2a Calyx cylindrical or tubular, 6-lobed; calyx appendages long, acute and erect ..... ***Lythrum**
- 2b Calyx campanulate, urceolate or (in fruit) globose, 4–6-lobed; calyx appendages various or absent:
  - 3a Flowers solitary, sessile; fruit opening by 2–4 longitudinal valves ..... **Rotala**
  - 3b Flowers usually in lax or condensed, sessile or pedunculate cymes; fruit opening irregularly or by an apical operculum:
    - 4a Fruit first opening by an apical operculum, later splitting irregularly; flowers sometimes aggregated into dense heads subtended by large bracts, sometimes di- or trimorphic, mostly 5- or 6-partite ..... **Nesaea**
    - 4b Fruit splitting irregularly from the first; flowers in lax or condensed cymes, never in heads, bracts always small and subulate, always homomorphic, always 4-partite ..... **Ammannia**

1b Trees, shrubs or undershrubs:
- 5a Trees or large woody shrubs; leaves with gland on midrib just below apex on lower surface; flowers in large panicles; seeds winged along whole margin ..... **Galpinia**
- 5b Slender shrubs or shrublets; leaves without glands; flowers in sessile or subsessile, few-flowered cymes, or rarely solitary; seeds not winged:
  - 6a Capsule first opening by an apical operculum, later splitting irregularly; petals white, pink or purple ..... **Nesaea**
  - 6b Capsule vertically 5- or 6-striate, splitting regularly along these lines; petals yellow ..... ***Heimia**

Ammannia L. 5474000

Linnaeus: 119 (1753); Immelman: 35 (1991).

Annual (possibly short-lived perennial) herbs; stem ± 4-angled. **Leaves** opposite-decussate, sessile. **Inflorescence** pedunculate or sessile, lax or condensed dichasial cymes of (1)3–many flowers; bracts 2 below each flower, small, subulate. **Flowers** 4- or 5-merous, never heterostylous. **Calyx**: tube broadly to narrowly campanulate, becoming globose in fruit, usually 4-lobed; lobes alternating with conical appendages or appendages 0, very short to nearly as long as lobes. **Petals** 1–4 or 0, caducuous. **Stamens** (2–)4(–8), arising from calyx tube, included or exserted, subequal. **Ovary** incompletely (1)2–5-locular, upper portion of septa incomplete; style 0–1.5 mm long. **Capsule** globose or ellipsoid, dehiscing irregularly. **Seeds** many and small, concave-convex, often with a float of thin-walled cells on concave side and margin which evaginates when moistened. x = 10, 13 (9, 11, 12, 17) (polyploidy).

Species ± 25, widespread in tropical, subtropical and temperate regions, 16 species recorded from Africa; 4 in sthn Afr.

Galpinia N.E.Br. 5480000

Brown: 345 (1894); Fernandes: 279 (1978).

Small tree or shrub. **Leaves** opposite-decussate, shortly petiolate, entire, with gland on midrib just below apex on underside of lamina. **Inflorescence** a large, terminal, compound cyme. **Flowers** 5- or 6-merous. **Calyx**: tube campanulate, lobes alternating with short appendages. **Petals** as many as calyx lobes and alternating with them, arising near top of calyx tube, oblong-ovate, not clawed. **Stamens** as many as calyx lobes, opposite petals, inserted below middle of calyx tube, exserted. **Ovary** subsessile, incompletely bilocular; placenta globular and basal; style slightly shorter than stamens; stigma as wide as or only slightly thicker than style; ovules many, small, on basal placenta. **Capsule** membranous, dehiscing irregularly. **Seeds** ± flat, margin winged all round. x = 8 (1 report).

Monospecific: *Galpinia transvaalica* N.E.Br., occurs from Mozambique and Zimbabwe to eastern sthn Afr.

*Heimia Link 5487000

Link: 63, t. 28 (1822); Schlechtendal: 346 (1827); Koehne: 241 (1903).

Herbs or shrubs. **Leaves** opposite-decussate, ternate or alternate, deciduous. **Flowers** 5–7-merous, solitary, homostylous. **Calyx** with appendages. **Petals** as many as calyx lobes, yellow. **Stamens** twice as many as calyx lobes, arising a quarter- to a third-way up on calyx tube. **Ovary** sessile, 3–6-locular; style longer than stamens; stigma broadly capitate. **Capsule** subcoriaceous, 3–6-loculicidal. x = 8.

Species 3 (or possibly 4), occurring naturally from Texas to Argentina and in Jamaica; 1 in sthn Afr.: **Heimia myrtifolia* (Cham. & Schltdl.) Kuntze, an adventive.

*Lythrum L. 5476000

Linnaeus: 446 (1753); Sonder: 516 (1862); Webb: 301 (1968).

Annual or perennial herbs. **Leaves** alternate, opposite or whorled. **Inflorescence** usually of solitary and subsessile cymes, these sometimes paired or small and whorl-like, sometimes aggregated into terminal spikes. **Flowers** (4–)6-merous, often trimorphically heterostylous, each flower with 2 bracteoles. **Calyx** subcylindrical; calyx appendages usually conspicuous, alternating with lobes. **Petals** usually present, arising near top of calyx tube. **Stamens** 2–12. **Ovary** sessile or subsessile, oblong, incompletely 2-locular; style included; stigma capitate. **Capsule** usually septicidally dehiscent with 2 valves, rarely dehiscing irregularly or by 4 apical teeth. **Seeds** few to many. x = 5 (high polyploidy).

Cosmopolitan with 35 species; in sthn Afr. 1 adventive species: **Lythrum hyssopifolium* L., mostly in the Cape region.

Nesaea Kunth 5486000

Kunth: 151 (1823); Sonder: 517 (1862); Immelman: 41 (1991).

Annual or perennial herbs, shrublets, rarely shrubs; branches ± 4-angled. **Leaves** opposite, ± decussate, rarely ternate or alternate (spiral), sessile or shortly petiolate. **Inflorescence** basically a cyme, this variously condensed, reduced or aggregated, often capituliform and subtended by large bracts at base, sometimes flowers solitary. **Flowers** 4-, 5-, or 6-merous, sometimes distylous or tristylous, bibracteolate. **Calyx**: tube variously shaped; lobes alternating with conical calyx appendages, these sometimes 0 or up to as long as lobes. **Petals** 0 or as many as calyx lobes, caducous. **Stamens** 4–12, arising on calyx tube, in 1 or 2 series, subequal or long and short stamens alternating, included or exserted. **Ovary** 2–5-locular, sessile; style nearly absent to much longer than calyx. **Capsule** globose to ellipsoid, opening by an apical operculum, lower part dehiscing irregularly later. **Seeds** many, small, concave-convex, without inflating wing. x = 10 (1 report, polyploidy).

Species 50–70, widespread, mostly Africa and Madagascar, a few in tropical Asia, Australia, North and Central America; 27 species, 4 varieties and 1 forma in sthn Afr.

Rotala L. 5473000

Linnaeus: 143 (1771); Fernandes: 312 (1978); Cook: 9 (1979); Immelman: 35 (1991).

Annual or rarely perennial herbs; stems terete or quadrangular, glabrous. **Leaves** opposite-decussate or verticillate, rarely alternate, ± sessile. **Flowers** homomorphic or dimorphic, occasionally cleistogamous, small, usually solitary and subsessile in leaf axils, occasionally aggregated into terminal racemes or spikes, very rarely in axillary umbels; bracts foliose or scale-like, bracteoles 2, rarely absent. **Calyx**: tube (3)4–6-lobed; lobes often alternating with cornate appendages; nectaries often present at base of tube. **Petals** as many as calyx lobes or 0, sometimes unequal, entire, erose or pinnately divided. **Stamens** 1–6, opposite sepals, arising at various heights in calyx tube, occasionally basal and appearing free, sometimes replaced by staminodes. **Ovary** sessile or shortly stipitate, incompletely 2–4-locular, dissepiments interrupted above placentas; ovules small and many; style very short to long; stigma capitate or rarely bilobed. **Capsule** septicidally 2–4-valved. **Seeds** small, few or many, concave-convex, with evaginating mucilaginous hairs. x = 8 (aneuploids, polyploidy).

Species ± 40, widespread in warm regions; 8 in sthn Afr., Namibia to KwaZulu-Natal.

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Malpighiaceae

(Rosidae—Malpighiales)

Compiled by R.H. Archer

Perennial scramblers, climbers, shrubs, or rarely shrublets; with medifixed unicellular hairs. **Leaves** opposite or alternate, rarely ternate, simple, entire, petiolate; petiole often with glands; stipules present or absent. **Flowers** bisexual, regular to slightly irregular, in axillary umbels or corymbs, or terminal racemes; pedicels 2-bracteate, jointed. **Calyx** 5-partite, or 5-lobed; sepals imbricate or rarely valvate, some or all 2-glandular on outer surface. **Petals** 5, free, sessile or clawed, often fimbriate or toothed. **Disc** inconspicuous. **Stamens** 10, sometimes some aborted; filaments often connate at base, shorter than anthers; anthers opening longitudinally or by an apical pore-like slit. **Ovary** superior, 3(4)-locular, with a single, pendulous ovule in each locule; placentas axile; styles as many as carpels, free or connate at base; stigma terminal or somewhat lateral. **Fruit** breaking up into 2 or 3(4) 1-seeded, winged mericarps (samaras), each with a dorsal or lateral wing. **Seeds** with a large embryo; endosperm ± 0.

Genera ± 60, species ± 850, cosmopolitan in tropical and subtropical areas with most species in the American tropics and subtropics; sthn Afr.: genera 3, species 4.

Sonder: 231 (1860); Launert:109 (1963); De Villiers & Botha: 66 (1986); Immelman: 63 (1986).

Key to genera

1a Leaves alternate; styles 2 ..... **Acridocarpus**
1b Leaves opposite or ternate; styles 3:
2a Ovary glabrous or hairy; flowers pink, irregular; samara with oblique dorsal wing ..... **Triaspis**
2b Ovary hairy; flowers yellow or orange, mostly regular; samara with a shield-like, lateral wing and usually a dorsal crest ..... **Sphedamnocarpus**

Acridocarpus Guill. & Perr. 4220000

Guillemin & Perrottet: 123, t. 29 (1831); Sonder: 321 (1860); Launert: 109 (1963); Immelman: 69 (1986).

Shrubs, woody climbers, or scramblers. **Leaves** usually alternate, entire or sinuate, usually with glands at base beneath; stipules absent. **Flowers** regular, in dense terminal racemes. **Calyx** 5-lobed, usually with 1 or more sunken glands on outside. **Petals** free, unguiculate, entire or slightly fimbriate, yellow. **Stamens**: filaments short, free or nearly so; anthers opening by short pore-like slit at apex. **Ovary** 3-locular, 1 locule abortive; styles 2, curved upwards. **Fruit** breaking into 2, dorsally winged samaras. $x = 9$.

Species ± 30, all tropical and subtropical Africa, with one each in Madagascar and New Caledonia; 1 in sthn Afr.: *Acridocarpus natalitius* Juss. with two varieties, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Sphedamnocarpus Planch. ex Hook.f. 4219000

Hooker: 256 (1862); Launert: 119 (1963); De Villiers & Botha: 66 (1986).

Scandent shrubs or climbers. **Leaves** opposite, ternate or rarely subopposite, with 2 stalked glands slightly above or below apex of petiole; stipules present. **Flowers** ± regular, in few-flowered axillary umbels terminating in leafy branches, rarely solitary. **Calyx** 5-partite. **Petals** caducous, yellow to orange, unguiculate, entire to slightly fimbriate. **Stamens** 10; filaments somewhat broadened and connate at base. **Ovary** 3(4)-locular, with dorsal wing usually hairy; styles 3(4); stigmas thickened. **Fruit** breaking into 3(4) samaras. $x = 10$.

Species 12, southern tropical and subtropical Africa, Madagascar and Mauritius; 1 in sthn Afr.: *Sphedamnocarpus pruriens* (Juss.) Szysyl., with 2 subspecies, Namibia, Botswana, Northern Province, Mpumalanga, Gauteng to KwaZulu-Natal.

Triaspis Burch. 4206000

Burchell: 280, t. 290 (1824); Sonder: 232 (1860); Hooker: 259 (1862); Launert: 113 (1963); Immelman: 63 (1986).

Scandent shrubs with twining stems, sometimes erect shrubs. **Leaves** opposite, rarely ternate, with or without minute glands on lamina; stipules absent. **Flowers** in axillary corymbose racemes. **Calyx** 5-lobed. **Petals** concave, shortly unguiculate, pink to purplish, margin fimbriate: 1 petal fimbriate along whole margin, 1 petal fimbriate at base only, 3 petals fimbriate along one side. **Stamens**: filaments often slightly unequal, free. **Ovary** 3-locular, hairy or glabrous; styles 3, curved; stigmas lateral. **Fruit** separable, breaking up into (2)3 shield- or saucershaped samaras with lateral wing and usually a dorsal crest. **Seeds** globose or ellipsoid. $x = 10$.

Species ± 12, all African; 2 in sthn Afr., widespread, but not often abundant, Namibia, Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland and Northern Cape.

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Malvaceae (in strict sense)

[Malvaceae—Malvoideae, fide Bayer *et al.* (1999)]

(Dilleniidae—Malvales)

Compiled by O.A. Leistner & C.L. Bredenkamp

Herbs, shrubs or trees, usually with stellate hairs, sometimes prickly or with small scales. **Leaves** alternate, simple, entire to digitately lobed or partite, usually palmately veined; stipules free, usually narrow or setaceous, often deciduous. **Flowers** regular, bisexual, often showy, usually pedicelled, basically in thyrses with cymose partial inflorescences, but usually solitary or fascicled in leaf axils or racemose to paniculate; with or without epicalyx of 3–many free or connate segments. **Calyx** (3–)5-lobed or entire; lobes valvate. **Petals** 5, free but often adnate to base of staminal tube, convolute, rarely 0. **Stamens** many, hypogynous; filaments united into a staminal tube surrounding style, tube ending in 5 small teeth to truncate (tribes **Malvavisceae** and **Hibisceae**) or split at apex into many filaments (tribe **Malveae**); anthers 1(2)-thecous, with longitudinal slits; pollen usually spinulose. **Gynoecium** superior, of 2–many, ± fused carpels with axile placentation, arranged around central persistent axis (torus or columella), with 1–many anatropous to campylotropous, bitegmic ovules, with zig-zag micropyles, in each locule/carpel; style simple, globose or club-shaped or more often branched, with branches as many or twice as many as carpels. **Fruit** a loculicidal capsule or schizocarp, usually breaking into dehiscent or indehiscent carpels, rarely fleshy. **Seeds** reniform, subglobose or obovoid, glabrous or hairy; cotyledons folded; endosperm oily, proteinaceous, copious to 0.

Worldwide ± 90 genera, ± 2000 species; sthn Afr.: genera 22 (7 exotic), species ± 165. The family comprises many weeds. Sporadic escapes from cultivation include **Alcea rosea* L. Hollyhock, **Lagunaria patersonii* G.Don, the Pyramid tree and **Malvaviscus arboreus* Cav., the Wax mallow.

Harvey: 157 (1860); Exell: 420 (1960); Exell: 1 (1969); Exell & Gonçalves: 1 (1979).

Judd & Manchester (1997), A.P.G. (1998) and Bayer *et al.* (1999) redefine Malvaceae to include Tiliaceae, Sterculiaceae and Bombacaceae. This results in a more clearly defined group and in the downgrading of borderline problems. Malvaceae in broad sense is divided into 9 subfamilies including Malvoideae which encompasses the present Malvaceae (in strict sense).

Key to genera

1a Style branches and stigmas twice as many as carpels (style branches mostly 10, carpels 5) (tribe **Malvavisceae**):
2a Epicalyx of (3–)5–16 filiform to broadly ovate, mostly free segments; carpels without hooked spines ..... **Pavonia**
2b Epicalyx of 5 lobes fused in lower third; carpels with hooked spines ..... ***Urena**
1b Style branches and stigmas as many as carpels (5–many) or style undivided and stigma ± entire:
3a Fruit a capsule or indehiscent and woody to ± fleshy; staminal tube toothed at apex to truncate, bearing anthers on most or much of its surface (tribe **Hibisceae**):
4a Style simple (rarely very slightly divided at the tip), apex 5-lobed or clavate with ± coherent stigmas:
5a Calyx spathaceous, thin, splitting laterally and deciduous with the corolla ..... ***Abelmoschus**
5b Calyx not splitting laterally, truncate or regularly lobed, persistent:
6a Calyx distinctly 5-lobed:
7a Calyx with rows of black oil glands along nerves ..... **Cienfugosia**
7b Calyx without black oil glands ..... **Radyera**
6b Calyx truncate, entire or at most dentate or undulate:
8a Epicalyx of 3 large, leaf-like, persistent bracts ..... **Gossypium**
8b Epicalyx of 3–8 small, narrow, deciduous bracts:
9a Fruit indehiscent, woody or somewhat fleshy ..... **Thespesia**
9b Fruit a loculicidally dehiscent capsule ..... **Azanza**
4b Style divided apically into distinct branches; stigmas capitate to club-shaped:
10a Style 3(4)-branched; epicalyx of 3 large, leaf-like, persistent bracts ..... **Gossypioides**
10b Style 5-branched; epicalyx of 5–20 variable bracts, occasionally absent:
11a Ovules and seeds solitary in each locule ..... **Kosteletzkya**
11b Ovules and (mostly) seeds 2 or more in each locule ..... **Hibiscus**
3b Fruit a schizocarp with mericarps eventually separating from a persistent axis; staminal tube split at apex into many filaments (tribe **Malveae**):
12a Epicalyx absent:
13a Ovules 2 or more per locule; seeds mostly 2 or more per mericarp or sometimes 1 by abortion:
14a Mericarps 5–40, not divided ..... **Abutilon**
14b Mericarps 3–5, ± divided into 2 compartments by a transverse constriction ..... **Wissadula**
13b Ovules 1 per locule; seeds 1 per mericarp:
15a Corolla cream to orange, rarely white; lateral walls or mericarps not disintegrating before fruit breaks up ..... **Sida**
15b Corolla blue; lateral walls of mericarps disintegrating before fruit breaks up ..... ***Anoda**
12b Epicalyx present:
16a Stigmas ± apical, usually with distinctly greater diameter than rest of style branches:
17a Ovules 1 per locule:
18a Petals yellow; mericarps with 1 apical and 2 dorsal awns pointing outward ..... ***Malvastrum**
18b Petals pink, mauve, purple or white; mercarps rounded or mucronate at apex ..... **Anisodontea**
17b Ovules or seeds 2 or more per locule:

19a Mericarps ± divided into 2 compartments by a transverse partition:
20a Plants prostrate, biennial to annual ..... ***Modiola**
20b Plants erect to decumbent, perennial ..... **Anisodontea**
19b Mericarps not divided into 2 compartments:
21a Lateral walls of mericarps with a clearly demarcated reticulate-fenestrate area in lower third..... ***Sphaeralcea**
21b Lateral walls of mericarps smooth or variously ridged to obscurely reticulate-fenestrate ..... **Anisodontea**
16b Stigmas decurrent on adaxial side of filiform to narrowly clavate style branches:
22a Epicalyx of 6–10 bracts ..... **Althaea**
22b Epicalyx of 3 bracts:
23a Epicalyx bracts fused at base, broad and leaf-like ..... ***Lavatera**
23b Epicalyx bracts free to base, mostly linear to lanceolate ..... **Malva**

*Abelmoschus Medik. 5014000

(Hibisceae)
Medikus: 45 (1787); Exell: 423 (1960).

Annual or perennial herbs. **Leaves** palmately lobed or divided (rarely almost entire). **Flowers** solitary, axillary or in terminal racemes by reduction of upper leaves. **Epicalyx** of 6–many filiform or linear bracts or much reduced and early caducous. **Calyx** thin, splitting laterally, circumscissile, slightly joined to base of corolla and deciduous with it. **Petals** yellow with dark purple-brown base. **Staminal tube** ± truncate at apex. **Gynoecium** 5-locular, with many ovules per locule; style not manifestly branched, with 5 sessile or subsessile capitate stigmas. **Capsule** elongated, oblong or ellipsoid. **Seeds** with minute stellate hairs, sometimes also pilose. x = very variable.

Species 15, Old World; 1 in sthn Afr.: **Abelmoschus esculentus* (L.) Moench (Okra or Lady's finger), cultivated in tropics and subtropics for its edible young fruits; may appear as an escape.

Abutilon Mill. 4983000

(Malveae)
Miller: [23] (1754); Harvey: 168 (1860); Meeuse: 484 (1960); Roessler: 1 (1969).

Herbs, suffrutices or shrubs, mostly erect, often softly tomentose. **Leaves** simple, usually ± ovate, often cordate, usually long-petioled. **Flowers** axillary, solitary or fascicled; pedicels usually articulated. **Epicalyx** 0. **Calyx** ± campanulate. **Petals** much longer than calyx, generally orange to yellow, rarely white. **Staminal tube** shorter than petals, divided at apex into many filaments, dilated towards base, ± glabrous to stellately hairy. **Gynoecium**: carpels 5–40, each with (1)2 ovules; style branches as many as carpels, filiform; stigmas capitate. **Fruit** a subglobose to cylindrical to almost disc-shaped schizocarp, often with depressed centre, of 5–40 laterally compressed, follicular 1–3(–9)-seeded mericarps with rounded, truncate, acute or awned apex and ventral side usually with a distinct tooth, originally fitting over top of torus; after separation mericarps often remaining pendulous on a basal carpophore. **Seeds** reniform, glabrous to sparsely stellate-tomentose. x = 7 (8, 9) (high polyploidy).

Species 100 or more, cosmopolitan in tropics and subtropics, 22 in sthn Afr., only 1 in winter-rainfall area; mostly in sunny, relatively dry, open situations; some pantropical weeds; some forms cultivated for their decorative flowers.

Althaea L. 4991000

(Malveae)
Linnaeus: 686 (1753); Roessler: 7 (1969).

Annual or perennial herbs, prostrate or erect. **Leaves** simple, rounded, deeply lobed, long-petiolate. **Flowers** axillary, solitary or in clusters of 2 or more. **Epicalyx** of 6–10 bracts fused at base. **Calyx** shallowly campanulate to cupular. **Petals** about as long as calyx, usually white. **Staminal tube** about as long as petals, divided at apex into many short filaments. **Gynoecium** of 8–12 ± free, 1-ovuled carpels; style branches as many as carpels, filiform, stigmatic surface decurrent on adaxial side. **Fruit** a depressed-globose, glabrous schizocarp of 8–12, 1-seeded, laterally compressed mericarps. **Seeds** reniform, glabrous. x = 7 (10, 13) (polyploidy).

Species 12, Europe (5) to NE Siberia; 1 in sthn Afr.: *Althaea ludwigii* L., Namibia, NW Northern Cape.

Anisodontea C.Presl 4986010

(Malveae)
Presl: 448 (1845); Bates: 215 (1969).

Sphaeroma Harv.: 166 (1860) not of DC. nor of Schltr. *Malvastrum* Harv.: 159 (1860) not of A.Gray; Phillips: 498 (1951) in part. *Sphaeralcea* Harv.: 165 (1860), not of A.St.-Hil.; Phillips: 497 (1951) in part.

Suffruticose perennials or shrubs, decumbent or ascending. **Leaves** simple to 3-, 5- or 7-lobed or -parted or trifoliolate, petiolate, rarely subsessile. **Flowers** solitary or in 2- to several-flowered open or globose cymes, sometimes appearing racemose or corymbose by reduction of upper leaves. **Epicalyx** of 3(–5) bracts, free or adnate to calyx tube. **Calyx** (3–)5-lobed, sometimes slightly accrescent; tube broadly campanulate. **Petals** 4 or 5(–8), longer than calyx, apex often emarginate to bilobed, base entire to bi-auriculate, white, pink to rose-magenta. **Staminal tube** included or exserted, split at apex into many filaments; anthers ± 15–170, in clusters, yellowish to magenta or crimson, usually drying black. **Gynoecium** of 5–26, ± free, 1–6-ovuled carpels; style branches as many as carpels, filiform; stigmas capitate to introrsely subdecurrent. **Fruit** a schizocarp, discoid (in 1-ovulate species) to ovoid or ellipsoid (in many-ovulate species); mericarps laterally compressed, chartaceous to woody, apically rounded to acute, 1–3-seeded, partially dehiscent to dehiscent. **Seeds** ovoid-reniform, glabrous to puberulent.

Species 21, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape; principally in karoo and fynbos.

*Anoda Cav. 5002000

(Malveae)
Cavanilles: 38 (1785); Krapovickas: 197 (1965); Correll & Johnston: 1054 (1970).

Annual erect herbs. **Leaves**, at least upper ones, 3–5-lobed. **Flowers** axillary, solitary. **Epicalyx** 0. **Calyx** 5-lobed. **Petals** pink to mauve. **Staminal tube** divided at apex into many filaments. **Gynoecium** 10–20-locular with 1 ovule per locule; style branches as many as carpels, filiform; stigmas capitate or truncate. **Fruit** a disc-like to hemispherical schizocarp with ± 10–20, 1-seeded, laterally flattened mericarps with a long apical beak and with sides disintegrating to release 1 large seed. x = 15 (7, 9, 13) (polyploidy).

Species ± 10, tropical America; cultivated ornamentals; 1 in sthn Afr.: **Anoda cristata* (L.) Schltdl., an occasional weed, possibly of fairly recent introduction and not yet widespread.

Azanza Alef. 5018010

(Hibisceae)

Alefeld: 298 (1861); Exell: 432 (1960).

Trees or shrubs. **Leaves** simple, palmately 3–5-lobed. **Flowers** axillary, solitary; pedicel articulate. **Epicalyx** fused with calyx, of 5–15 early deciduous teeth or lobes. **Calyx** cupuliform, persistent. **Petals** narrowly obliquely obovate, yellow or purplish with dark red or purple base. **Staminal tube** bearing anthers throughout. **Gynoecium** 5-locular, with 2–many ovules per locule; style undivided, club-shaped. **Fruit** a ± globose, loculicidally dehiscent, glutinous capsule. **Seeds** hemispherical with brown woolly floss. $x = 7$ (polyploidy).

Species 2 or 3, Africa; 1 in sthn Afr.: *Azanza garckeana* (F.Hoffm.) Exell & Hillc.

Cienfuegosia Cav. 5019000

(Hibisceae)

Cavanilles: 174, t. 72, fig. 2 (1787); Exell: 426 (1960) includes *Fugosia* as in Phillips: 501 (1951); Exell: 7 (1969).

Small shrubs or perennial herbs with woody rootstock. **Leaves** subentire to 3–5-palmatisect; stipules filiform to cordate-acuminate, persistent. **Flowers** axillary, solitary. **Epicalyx** of 3–12 ± filiform, caducous bracts. **Calyx** lobes with oil glands in a double row along each nerve. **Petals** obliquely obovate, yellow with dark red or purple base; peduncle articulated near base. **Staminal tube** much shorter than petals, bearing anthers at apex. **Gynoecium** 3–5-locular, with several ovules per locule; style undivided, club-shaped. **Fruit** a 3–5-locular, loculicidally dehiscent capsule, with several seeds per locule. **Seeds** usually ellipsoid, densely silky-woolly to almost glabrous. $x = 10$ (11, 13).

Species ± 26, tropical and subtropical Africa and America; 3 in sthn Afr., N Namibia, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Gossypioides Skovst. ex J.B.Hutch. 5020010

(Hibisceae)

Hutchinson: 131 (1947); Exell: 432 (1960).

Scandent shrubs, gland-dotted in most parts. **Leaves** 3–5-lobed, orbicular in outline, large; stipules falcate, persistent. **Flowers** on 1–3-flowered sympodial branches, showy; pedicels without articulation. **Epicalyx** of 3 foliaceous, coarsely dentate, persistent bracts. **Calyx** cupuliform. **Petals** obliquely obovate, yellow with dark base. **Staminal tube** much shorter than petals, bearing anthers in upper half. **Gynoecium** 3- or 4-locular, with 2 ovules per locule; style branches as many as carpels; stigmas capitate to club-shaped, short. **Fruit** a loculicidally dehiscent capsule with 2 seeds per locule. **Seeds** narrowly ellipsoid with dense, long woolly hairs (floss or lint), but no fuzz (shorter, denser hairs). $x = 12$ (1 report).

Species 2, tropical Africa and Madagascar; 1 in sthn Afr., N KwaZulu-Natal.

Gossypium L. 5020000

(Hibisceae)

Linnaeus: 693 (1753); Exell: 428 (1960); Exell: 8 (1969); Vollesen: 337 (1987).

Shrubs or shrublets, nearly all parts dotted with black oil glands. **Leaves** 3–7-lobed to divided, rounded in outline; caducous or persistent; stipules linear to linear-lanceolate. **Flowers** solitary, axillary, or in several-flowered, sympodial inflorescences, showy; pedicels without articulation. **Epicalyx** of 3, usually foliaceous, persistent bracts. **Calyx** cupuliform, truncate. **Petals** obovate, with scattered black dots, yellow or purple, often purple at base. **Staminal tube** much shorter than petals, densely covered with horseshoe-shaped anthers throughout. **Gynoecium** 3–5-locular, with several ovules per locule; style short, undivided; stigma club-shaped, rarely slightly separating at tip. **Fruit** a loculicidally dehiscent capsule with several seeds per locule. **Seeds** narrowly ellipsoid, with dense, long, woolly hairs (lint or floss), often also with fuzz (a shorter, denser indumentum), sometimes nearly glabrous. $x = 13$ (12) (polyploidy).

Species ± 39, worldwide in tropics and warm temperate regions; several species cultivated; 3 in sthn Afr., N Namibia, N Botswana, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Hibiscus L. 5013000

(Hibisceae)

Linnaeus: 693 (1753) name conscrved; Harvey: 170 (1860); Exell: 434 (1960); Henderson & Anderson: 210 (1966); Exell: 10 (1969); Roessler: 11 (1985).

Annual or perennial herbs, undershrubs, shrubs, rarely small trees. **Leaves** simple, lobed or digitately compound. **Flowers** usually solitary, axillary or forming terminal racemes or corymbs by reduction of upper leaves, often showy; pedicels usually articulated. **Epicalyx** of (0)5–20 bracts. **Calyx** 5-lobed or sometimes 5- or 10-toothed, persistent. **Petals** mostly much longer than calyx, often yellow with dark purple base, or red, pink, purplish or white. **Staminal tube** ± truncate at apex, bearing anthers throughout or only in upper half. **Gynoecium** 4- or 5-locular, with 3–many ovules per locule; style branches as many as carpels, filiform; stigmas usually discoid, sometimes capitate. **Fruit** a loculicidally dehiscent capsule. **Seeds** globose or reniform, glabrous or hairy. $x = 12$ (10, 11, 15, 16, 17, 18, 19) (high polyploidy).

Species ± 300, cosmopolitan in tropics and subtropics, rare in temperate zone; more than 50 in sthn Afr., widespread, but poorly represented in Western Cape.

Kosteletzkya C.Presl 5015000

(Hibisceae)

Presl: 130, t. 70 (1835); Exell: 472 (1960); Exell: 24 (1969).

Annual or perennial herbs, erect, branching from base. **Leaves** simple, unlobed, ovate to linear, serrate. **Flowers** axillary, solitary. **Epicalyx** of 7–11 filiform to linear bracts. **Calyx** 5-lobed. **Petals** much longer than calyx, white sometimes tinged pink. **Staminal tube** bearing anthers ± throughout, truncate at apex. **Gynoecium** 5-locular with 1 ovule per locule; style branches as many as carpels, filiform; stigmas capitate. **Fruit** a 5-angled, depressed-globose, loculicidally dehiscent capsule. **Seeds** reniform, with dense brown hairs. $x = 17$ (1 report).

Species ± 50, mostly tropical America; 1 in sthn Afr.: *Kosteletzkya buettneri* Gürke, N Namibia (Okavango and Caprivi); riverbanks and swampy places.

*Lavatera L. 4990000

(Malveae)

Linnaeus: 690 (1753); Fernandes: 251 (1968).

Herbs or soft-wooded shrubs, usually erect. **Leaves** simple, rounded, usually palmately lobed. **Flowers** axillary, solitary or fascicled. **Epicalyx** of 3 foliaceous bracts connate at base and fused with base of calyx, equalling or exceeding calyx. **Calyx** campanulate, slightly accrescent. **Petals** longer than calyx, pink to purple, forming funnel-shaped to rotate corolla. **Staminal tube** split at apex into many filaments. **Gynoecium** of 5–12 ± free, 1-

ovuled carpels; style branches as many as carpels, filiform, stigmatic surface decurrent on adaxial side. **Fruit** a discoid to pumpkin-shaped schizocarp crowned in centre by persistent conical style base; mericarps 5–12. **Seeds** reniform, glabrous. $x = 7$ (9, 10, 11) (high polyploidy, B-chromosomes).

Species 21–23 in Old and New World (Ray 1995), closely related to *Malva* and still generally partly confused with it; 4 naturalised in sthn Afr.. Namibia, Free State, Northern, Western and Eastern Cape.

Malva L. 4992000

(Malveae)

Linnaeus: 687 (1753); Harvey: 159 (1860); Meeuse: 501 (1960); Henderson & Anderson: 212 (1966); Roessler: 24 (1969); Ray: 29 (1995).

Annual to weakly perennial herbs, erect to prostrate. **Leaves** simple, undivided to palmately lobed, mostly ± suborbicular-reniform in outline. **Flowers** axillary, solitary or in few-flowered clusters, small to medium-sized; pedicels short to ± absent. **Epicalyx** of 3 free bracts sometimes partly fused to base of calyx, usually shorter than calyx. **Calyx** cupular to rotate. **Petals** ± equalling to twice as long as calyx, emarginate to deeply notched, white, mauve or purple, never yellow. **Staminal tube** shorter than petals, divided at apex into many very short filaments. **Gynoecium** of 7–16, 1-seeded carpels; style branches as many as carpels, filiform, stigmatic surface decurrent on adaxial side. **Fruit** a discoid schizocarp with a depressed centre, separating into 7–16, 1-seeded, reniform, laterally flattened, awnless, indehiscent mericarps with reticulately ridged to almost smooth, glabrous to pubescent walls. **Seeds** reniform, glabrous. $x = 7$ (8, 10, 12) (high polyploidy).

Species ± 30, temperate and subtropical Old World and New World (Ray 1995), several cosmopolitan weeds, some cultivated ornamentals; 7 in sthn Afr., widespread. In Africa the genus is perhaps only truly native in the Mediterranean region.

*__Malvastrum__ A.Gray 4995000

(Malveae)

Gray: 21 (1849) name conserved; Meeuse: 503 (1960); Krapovickas: 209 (1965).

Annuals or suffruticose, erect to ± spreading perennials. **Leaves** simple, unlobed, lanceolate to nearly orbicular, dentate, shortly petiolate; stipules subulate to narrowly lanceolate to nearly orbicular. **Flowers** axillary, solitary or in few-flowered clusters. **Epicalyx** of 3 linear to lanceolate bracts free to base, shorter than calyx. **Calyx** campanulate, foliaceous in fruit. **Petals** scarcely longer than calyx, yellow or yellow-orange. **Staminal tube** shorter than petals; filaments divided at apex into ± 20–40 anthers. **Gynoecium** of 10–15, 1-ovulate carpels; style branches as many as carpels, filiform; stigmas capitate. **Fruit** a discoid schizocarp separating into 10–15, 1-seeded, indehiscent, reniform, laterally flattened, shortly-awned, hispid mericarps. **Seeds** reniform, glabrous. $x = 6$ (5, 8) (polyploidy).

Species ± 12, warm-temperate to tropical Americas, 2 naturalised worldwide; 1 in sthn Afr.: **Malvastrum coromandelianum* (L.) Garcke, widespread.

*__Modiola__ Moench 4987000

(Malveae)

Moench: 619 (1794); Schumann: 38 (1890); Burtt Davy: 274 (1932); Adamson: 581 (1950); Krapovickas: 185 (1965).

Low, diffuse annual or biennial herbs. **Leaves** simple, rounded, coarsely crenate to deeply palmately lobed; stipules persistent. **Flowers** axillary, solitary, small. **Epicalyx** of 3 free, ± persistent bracts. **Calyx** ± deeply 5-fid; somewhat accrescent. **Petals** longer than calyx, red or rose. **Staminal tube** divided at apex into many filaments, dilated towards base. **Gynoecium** of 15–20, mostly 2-ovuled carpels; style branches as many as carpels, filiform; stigmas capitate. **Fruit** a schizocarp of 15–20, usually 2-seeded, 2-awned, partly loculicidal mericarps, transversally septate between seeds. **Seeds** reniform. $x = 7, 9$ (1 report each).

Species 1, tropical America, naturalised in sthn Afr.: **Modiola caroliniana* (L.) G.Don, Gauteng, Mpumalanga, Free State, Western and Eastern Cape. Burtt Davy (1932) reported that he introduced this species in 1903 as a pasture plant. Schumann (1890), however, already recorded the species for South Africa.

Pavonia Cav. 5007000

(Malvavisceae)

Cavanilles: 2 (1786) name conserved; Harvey: 169 (1860); Meeuse: 504 (1960); Roessler: 25 (1969).

Herbs, suffrutices or shrubs. **Leaves** undivided to palmatipartite, often cordate, mostly palmately veined, petiolate. **Flowers** mostly axillary, solitary or occasionally in pseudoracemes or terminal subcapitate racemes; pedicels usually articulate. **Epicalyx** of (3–)5–16 filiform to broadly ovate, mostly free, bracts. **Calyx** broadly campanulate to tubiform, usually divided to beyond middle, often somewhat accrescent. **Petals** longer than calyx, usually ± obliquely obovate, yellow, white or reddish to mauve. **Staminal tube** as long as or somewhat shorter than petals, 5-toothed or truncate at apex, bearing anthers mainly in upper half, sometimes nearly down to base. **Gynoecium** of 5 carpels, each with 1 ovule; style branches 10, usually shorter than style; stigmas capitate, often penicillate. **Fruit** of 5 1-seeded, trigonous, dorsally convex, membranous or woody mericarps separating from axis, dorsally often ridged or muricate, apex rounded, rarely apiculate or awned, margins sometimes winged. **Seeds** kidney-shaped. $x = 7$ (13) (high polyploidy).

Species ± 150, widespread in tropics and subtropics, especially in the New World; 11 in sthn Afr., widespread, but rare in Western Cape.

Radyera Bullock 5013010

(Hibisceae)

Bullock: 454 (1957); Exell: 28 (1969).

Allenia Phillips: 33 (1944); Phillips: 500 (1951) not of Ewart.

Perennial herbs, prostrate with dense, stellate, irritant hairs. **Leaves** ovate or suborbicular, cordate, prominently veined on undersurface, rugose above. **Flowers** axillary, 2–4-nate. **Epicalyx** of 12 linear, tomentose bracts connate at base. **Calyx** campanulate; lobes shorter than tube, accrescent. **Petals** about as long as calyx, flame-red to crimson. **Staminal tube** shorter than petals, truncate at apex, bearing horseshoe-shaped anthers in upper half. **Gynoecium** 5-locular, with several ovules per locule; style undivided, terete, capitate, with stigma 5-grooved. **Fruit** a loculicidally dehiscent capsule. **Seeds** glabrous.

Species 2, Australia and sthn Afr.; 1 in sthn Afr.: *Radyera urens* (L.f.) Bullock, S Namibia and arid to semi-arid central South Africa: North-West, Free State, Northern, Western and Eastern Cape.

Sida L. 4998000

(Malveae)

Linnaeus: 683 (1753); Harvey: 166 (1860); Meeuse: 475 (1960); Henderson & Anderson: 216 (1966); Roessler: 29 (1969).

Annual or perennial herbs, suffrutices or shrublets. **Leaves** mostly simple and unlobed, rarely deeply lobed to divided, usually cuneate to cordate at base. **Flowers** mostly axillary, solitary to clustered, sometimes, by

abortion of upper leaves, in racemes or panicles; pedicels usually articulated. **Epicalyx** 0. **Calyx** mostly shallowly campanulate, often angular. **Petals** forming a rotate corolla; cream to orange, rarely white. **Staminal tube** usually shorter than petals, divided at apex into many free filaments; anthers reniform. **Gynoecium** of 5–12, 1-ovulate carpels; style branches as many as carpels, filiform; stigmas capitate to truncate. **Fruit** a schizocarp with 5–12, ± 3-angled mericarps with 2 awns or awnless at apex, indehiscent or partially dehiscent, glabrous or hairy, eventually falling away from slender columella. **Seeds** ± 3-angled. $x = 7$ (6, 8, 11, 17) (polyploidy, B-chromosomes).

Species ±150, cosmopolitan in tropics and subtropics, especially the Americas; several pantropical weeds; 11 in sthn Afr., widespread; mostly in open, sunny situations from semidesert to forest margins; some species introduced.

*Sphaeralcea A.St.-Hil. 4986000

(Malveae)

Saint-Hilaire: plate 52 (1827); Krapovickas: 212 (1965).

Suffruticose perennials, rarely annuals. **Leaves** shallowly to deeply 3- or 5-lobed or -partite; stipules subulate. **Flowers** axillary, in dense to open cymes. **Epicalyx** of 3 free, filiform to lanceolate bracts, usually shorter than calyx. **Calyx** ± campanulate. **Petals** slightly longer than calyx, reddish orange, pinkish, yellowish to white. **Staminal tube** mostly shorter than petals; filaments ± terminal; anthers mostly 50–100. **Gynoecium** of (7–) 10–16(–22) free or slightly coherent, 1–3-ovuled carpels; style branches as many as carpels. **Fruit** a discoid to hemispherical schizocarp with ± 10–16, 1–3-seeded, partially dehiscent, apically beaked mericarps. **Seeds** reniform, pubescent. $x = 5$ (high polyploidy).

Species ± 60, arid America; several cultivated herbs or subshrubs; 1 in sthn Afr.: **Sphaeralcea bonariensis* (Cav.) Griseb. apparently introduced after 1900 and now fairly widespread, mainly in warm central regions.

Thespesia Sol. ex Corrêa 5018000

(Hibisceae)

Corrêa: 290, t. 8 fig. 2 (1807); Exell: 421 (1960).

Small trees or shrubs. **Leaves** large, simple, mostly shallowly 3-lobed, lepidote. **Flowers** axillary and solitary or forming terminal racemes or panicles by reduction of upper leaves. **Epicalyx** of 3–5 early caducous bracts. **Calyx** cupuliform, truncate. **Petals** obovate, yellow, turning pinkish brown. **Staminal tube** densely covered with anthers ± throughout. **Gynoecium** 5-locular, with 3 or 4 ovules per locule; style undivided, club-shaped. **Fruit** subglobose, woody or somewhat fleshy, indehiscent or loculicidally 5-valved. **Seeds** irregularly lunate, ± glabrous. $x = 13$ (7, 12) (polyploidy).

Species ± 17, ± cosmopolitan in tropics; 1 in sthn Afr.: *Thespesia acutiloba* (Baker f.) Exell & Mendonça, N KwaZulu-Natal; bushveld and thickets on recent sands near coast.

*Urena L. 5006000

(Malvavisceae)

Linnaeus: 692 (1753); Meeuse: 503 (1960).

Erect to spreading suffrutices. **Leaves** 3–5-palmately lobed to unlobed, palmately 3–7-nerved with a conspicuous gland near base of central nerve on lower surface. **Flowers** axillary, solitary or crowded towards ends of branches. **Epicalyx** of 5 bracts fused in lower third. **Calyx** campanulate, shorter than epicalyx. **Petals** longer than epicalyx, rose-pink or mauve. **Staminal tube** ± as long as petals, ± truncate at apex, bearing almost sessile anthers in upper half. **Gynoecium** of 5 carpels, each with 1 ovule; style branches 10, very short, recurved; stigmas capitate, dark purple, penicillate. **Fruit** a subglobose schizocarp with 5 trigonous, dorsally convex mericarps with retrorsely barbed spines mainly at apex, indehiscent. **Seeds** ± reniform, minutely hairy to glabrous. $x = 7$ (high polyploidy).

Species 1: **Urena lobata* L., pantropical weed, possibly of Asian origin, Namibia (Caprivi), Mpumalanga.

Wissadula Medik. 4985000

(Malveae)

Medikus: 24 (1787); Meeuse: 499 (1960); Roessler: 32 (1969).

Erect suffrutices or weak shrubs. **Leaves** petiolate, simple, usually cordate, entire or denticulate; stipules setaceous. **Flowers** in lax panicles; pedicels articulated. **Epicalyx** 0. **Calyx** cup-shaped. **Petals** much longer than calyx, yellow, cream or orange. **Staminal tube** very short, bearing anthers only at apex. **Gynoecium** of 3–5, (1)2- or 3-ovuled carpels; style branches as many as carpels, filiform; stigmas capitate. **Fruit** a ± globular schizocarp with 3–5 beaked mericarps ± divided transversally into 2 compartments by an oblique constriction of lateral walls, usually with 2 seeds in upper and 1 in lower compartment. **Seeds** subglobose, pubescent. $x = 7$ (8).

Species ± 40 mainly in tropical America; 1 in sthn Afr.: *Wissadula rostrata* (Schumach.) Hook.f., Namibia and subtropical Mpumalanga.

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Melastomataceae

(Rosidae—Myrtales)

Compiled by C.L. Bredenkamp

Herbs, shrubs, or trees, rarely scandent or prostrate; stem often 4-angled. **Leaves** opposite, rarely whorled, simple, often petiolate, mostly with 3–9 ± parallel main veins from base or near to it, rarely penninerved, entire, crenate or toothed; stipules 0. **Flowers** regular, bisexual, in spikes, panicles, corymbs, or sometimes fascicled or solitary. **Calyx** 4- or 5-lobed or truncate; tube often adnate to ovary. **Petals** free, as many as calyx lobes, arising in mouth of calyx tube, imbricate. **Stamens** as many as, or more often, twice as many as petals and arising with them, equal or unequal; filaments usually with a conspicuous joint; anthers 1- or 2-thecous, basifixed or dorsifixed, often linear, often horned or spurred, with connective often thickened at apex, opening by pores or lateral slits. **Ovary** inferior or partly inferior, 1- or 2–many-locular, with free-central placenta, with few to many ovules in each locule; stigma simple or lobed. **Fruit** a loculicidal capsule or berry, usually enclosed in persistent calyx. **Seeds** many, usually minute.

Genera 240, species 3 000, cosmopolitan under tropical and subtropical conditions; sthn Afr.: genera 5, species 11.

Fernandes & Fernandes: 220 (1978); Jacques-Félix: 235 (1995).

Key to genera

1a Herbs or shrubs, usually with hairs or setae; ovary 4- or 5-locular; filaments with appendages:
  2a Small herbs; flowers congested; stamens equal ..... **Antherotoma**
  2b Herbs or shrubs; flowers solitary or in short panicles; stamens unequal:
    3a Calyx usually provided with appendices between the sepals; lobes persistent or caducous ..... **Dissotis**
    3b Calyx without appendices between sepals; lobes persistent:
      4a Flowers 5-merous, enclosed within large, sheathing, persistent bracts ..... **Melastomastrum**
      4b Flowers 4-merous, bracts subtending flowers not markedly conspicuous, persistent or caducous ..... ***Heterocentron**
1b Trees or shrubs, glabrous; ovary 1-locular; filaments without appendages ..... **Memecylon**

Antherotoma (Naudin) Hook.f. 5651000

Hooker: 745 (1867); Fernandes & Fernandes: 229 (1978); Jacques-Félix: 268, 282 (1995).

Herbs, often unbranched, covered with setae. **Leaves** opposite, subsessile, spaced, usually lanceolate, entire. **Flowers** few, congested at ends of stems or branches. **Calyx** 4-lobed; tube membranous, campanulate; lobes shorter than tube, ovate, obtuse, with few long setae. **Petals** 4, arising in mouth of calyx tube, obovate, scarcely clawed, with few setae at tip. **Stamens** 8, equal, arising in mouth of calyx tube, about as long as petals; dorsifixed; pedoconnective (prolongation of connective below anther thecae) strictly without heel or 'talon,' outgrowth often reduced but always present, bilobed or bipartite; anthers 1-thecous, opening by a terminal pore. **Ovary** inferior, 4-locular, with many ovules in each locule, with a crown of setae at apex; style thick, terete, slightly longer than stamens; stigma subcapitate. **Fruit** a capsule enclosed in calyx. **Seed** sculptured.

Species 11 in Africa, formerly included in either *Osbeckia* or *Dissotis*; 3 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Eastern Cape.

Dissotis Benth. 5659000

Bentham: 346 (1849) name conserved; Fernandes & Fernandes: 240 (1978); Jacques-Félix: 268 (1995).

Osbeckia Sond.: 518 (1862); Jacques-Félix: 238 (1995) in part.

Herbs, undershrubs, or shrubs, usually hairy. **Leaves** shortly petiolate, usually oblong-lanceolate or lanceolate, entire, 3–5-nerved. **Flowers** solitary, capitate or in short, terminal panicles; bracts sometimes present, small. **Calyx** 4- or 5-lobed; tube ovoid or campanulate, produced above ovary, glabrous or with stellate bristles, or scales; lobes nearly as long as tube, often alternating with bristly teeth or thick processes, persistent or deciduous. **Petals** 4 or 5, obovate, sessile. **Stamens** 8–10, unequal; characterised by a connective or pedoconnective incurved at back, without heel or 'talon', provided with 2 lateral appendages; anthers linear, with wavy margins, opening by a terminal pore. **Ovary** adnate to wall of calyx tube, 4- or 5-locular, with many ovules in each locule, glandular-hairy, hirsute or with a crown of setae at apex; style straight or curved, usually longer than stamens; stigma simple or subcapitate. **Fruit** a capsule, included in persistent calyx. **Seed** small, cochleate. $x = 17$ (10, 16?).

Species ± 120. Africa: ± 3 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Mpumalanga, Swaziland, throughout KwaZulu-Natal to Eastern Cape border area.

*Heterocentron Hook. & Arn. 5642000

Hooker & Arnot: 290 (1838); Bailey & Bailey: 558 (1977); Fernandes & Fernandes: 220 (1978).

Herbs or shrubs. **Leaves** small, entire, 3–15-nerved, petiolate. **Flowers** solitary or in panicles, small, white, rose or purple, 4-merous. **Stamens** 8, dimorphic. **Ovary** often setose. **Fruit** a 4-valved capsule. $x = 9$ (polyploidy).

Species ± 27, herbs and shrubs native to S Mexico and central America; naturalised in Hawaii, Jamaica, Java and New Guinea. **Heterocentron macrostachyum* Naud., first record from sthn Afr. at PRE, collected at White River (Mpumalanga).

Melastomastrum Naudin 5659010

Naudin: 296 (1850); Fernandes & Fernandes: 12 (1956).

Herbs, undershrubs or shrubs, usually hairy. **Leaves** shortly petiolate, rarely sessile, more or less oblong-lanceolate, entire, 3–5-nerved. **Flowers** solitary, in heads, or shortly panicled, enclosed within large, persistent bracts. **Calyx** 5-lobed; tube cylindric, mouth sometimes contracted; lobes persistent, without appendages. Characters of corolla and other parts of flowers very similar to those of *Dissotis*.

Species 4, Africa; 1 in sthn Afr.: *Melastomastrum segregatum* (Benth.) A.Fern. & R.Fern., northern border of Namibia including Caprivi.

Memecylon L. 5788000

Linnaeus: 349 (1753); Fernandes & Fernandes: 221 (1978); Van Wyk: 173 (1983); Jacques-Félix: 266 (1995).

Eugenia Sond.: 523 (1862) in part.

Trees or shrubs, usually completely glabrous, young branches narrowly 4-winged, 4-gonous or terete. **Leaves** entire, longitudinally 1–3(–5)-nerved, shortly petiolate. **Flowers** 4-merous, small or minute, in fascicles or in cymes forming panicle-like or corymbose inflorescences; bracts minute. **Receptacle** broadly campanulate, hemispherical or cupular, limb ± dilated, truncate, 4-toothed or -lobed. **Petals** broadly ovate, obovate, circular-subdeltate, obtuse or apiculate, whitish or bluish. **Stamens** 8, equal, sometimes 4 with abortive anthers; filaments filiform; anthers axe-shaped, with 2 anterior thecae dehiscing by 2 longitudinal slits and usually with a gland on the concave back. **Ovary** 1-locular, wholly adherent to receptacle, sunken or convex at apex; style filiform; ovules 2–12(–20), on a central placenta. **Fruit** an ovoid, globose or ellipsoid, 1(2)-seeded berry, crowned by persistent calyx. **Seeds** large; cotyledons crumpled or not so. $x = 7$ (12?) (polyploidy).

Species 150, Old World: Africa to Asia and Australia, ± 50 in Africa; 3 in sthn Afr., KwaZulu-Natal to Eastern Cape border area.

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Meliaceae

(Rosidae—Sapindales)

Compiled by R.H. Archer

Trees, shrubs, or shrublets; monoecious or dioecious; indumentum of simple, glandular and tufted-stellate hairs. **Leaves** usually alternate, sometimes fascicled, simple, pari- or imparipinnate, 2- or 3-pinnate or 1–3-foliolate; stipules 0. **Flowers** bisexual or unisexual, regular, usually paniculate, sometimes fascicled, or solitary. **Calyx** 4- or 5-fid or -partite, usually imbricate, never completely covering corolla in bud. **Petals** (3)4 or 5(–7), free, contorted or imbricate. **Disc** intrastaminal, variable, rarely absent. **Stamens** (5–)8–10(–20); filaments ± united into a staminal tube, or rarely free. **Ovary** superior, (2)3–5(–20)-locular with 1 or many axile ovules in each locule; style simple; stigma discoid, capitate, or sometimes lobed. **Fruit** a loculicidal or septifragal capsule, drupe, or rarely a berry. **Seeds** 1–many in each locule, sometimes winged, or arillate.

Genera ± 50, species 800, confined to tropics and subtropics of both hemispheres; sthn Afr: genera 10 (4 naturalised), species 14 indigenous, 4 naturalised.

Pennington & Styles: 419 (1975); White & Styles: 285 (1963); White: 143 (1986); White & Styles: 39 (1986); Styles & White: 1 (1991).

Key to genera

1a Leaves imparipinnate, pinnately 1- or 3-foliolate or simple; fruit a berry or drupe or a loculicidal capsule; seeds not winged but sometimes arillate:
  2a Leaves simple or rarely irregularly pinnate:
    3a Leaves simple; stamens free almost to the base; fruit a large inflated capsule, valves separating only near the apex..... **Nymania**
    3b Leaves simple or rarely variable and irregularly pinnate with deeply lobed or partite leaflets; stamens completely united or united almost to the apex; fruit a leathery or woody capsule, valves separating almost to the base..... **Turraea**
  2b Leaves compound:
    4a Leaves 2- or 3-pinnate; staminal tube purplish; fruit a drupe ..... ***Melia**

4b Leaves regularly once-pinnate; fruit a capsule or a drupe:
5a Staminal tube cup-shaped, filaments united for whole or most of their length; fruit a drupe ..... **Ekebergia**
5b Staminal tube elongate, filaments united only in lower half to two-thirds; fruit a capsule:
6a Filaments with paired deltate appendages at apex; capsule with 3 leathery valves without appendages ..... **Trichilia**
6b Filaments without appendages; capsule with 4 or 5 woody valves covered with conspicuous ridges and antler-like appendages ..... **Pseudobersama**
1b Leaves usually paripinnate; fruit a septifragal capsule; seeds winged, not arillate:
7a Flowers with an androgynophore to which the bases of the petals are adnate; stamens 5, free:
8a Androgynophore much longer than the ovary; first leaflets of seedlings entire ..... ***Cedrela**
8b Androgynophore shorter than or equalling the ovary; first leaflets of seedlings lobed or toothed ..... ***Toona**
7b Flowers without an androgynophore; petals free; stamens 8–10, filaments partly or completely united:
9a Capsule globose or subglobose; seeds orbicular to suborbicular, winged all the way round ..... ***Khaya**
9b Capsule elongate, at least twice as long as broad; seeds with a terminal wing ..... **Entandrophragma**

*Cedrela P.Browne 4155000

Browne: 158 (1756): Pennington & Styles: 512 (1975); Styles & White: 43 (1991).

Deciduous trees, monoecious. **Leaves** usually paripinnate; leaflets entire. **Flowers** unisexual, in large branched panicles. **Calyx** variable, lobed almost to base, shallowly dentate, or cup-shaped and split down one side. **Petals** 5, imbricate, adnate for one-third of their length to a long, columnar androgynophore by a median carina (thereby preventing their spreading in open flowers). **Stamens** 5, free, adnate to androgynophore below; staminodes absent. **Ovary** 5-locular; locules with 6–12 ovules; style-head discoid with glandular stigmatic papillae. **Fruit** a pendulous, thinly or thickly woody, obovoid or claviform, septifragal capsule, opening from apex by 5 valves; columella woody, sharply 5-angled. **Seeds** with a terminal wing, attached by seed-end to apex of columella. $x = 8$, 13 (9, 12) (polyploidy).

Species ± 8 in Neotropics; **Cedrela odorata* L. is widely planted in Africa for timber.

Ekebergia Sparrm. 4193000

Sparrman: 282 (1779); Sonder: 247 (1860); White & Styles: 315 (1963); White & Styles: 51 (1986).

Trees or shrubs, dioecious. **Leaves** imparipinnate; leaflets entire, opposite or subopposite; leaf rachis sometimes winged. **Flowers** unisexual; in axillary panicles. **Calyx** saucer-shaped, 4- or 5(6)-lobed. **Petals** 4–6, imbricate. **Disc** annular, free or united to ovary. **Stamens** 10, connate into cup or basin-shaped tube; anthers sessile on tube. **Ovary** sessile, 2–5(6)-locular, with 2 superposed ovules in each locule; style short and thick; stigma obscurely 4- or 5-lobed. **Fruit** a dry, globose drupe with 1–5 pyrenes. **Seeds** mostly 1 per locule, exarillate. $x = 23$.

Species 4, confined to Africa; 2 or 3 in sthn Afr; Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, SE Western and Eastern Cape.

Entandrophragma C.DC. 4163000

Candolle: 582 (1894); White & Styles: 289 (1963); White & Styles: 59 (1986).

Trees, usually large, monoecious. **Leaves** paripinnate, crowded at tips of branches; leaflets entire. **Flowers** unisexual; in axillary panicles. **Calyx** saucer-shaped, 5-lobed. **Petals** 5, contorted. **Disc** in the form of 10 indistinct or distinct short ridges connecting ovary to base of staminal tube. **Stamens** 10; filaments connate into an urceolate tube ± half as long as petals. **Ovary** subglobose, 5-locular, with 4–12 pendulous ovules in two rows in each locule; style short, cylindric; stigma discoid with 5 radiating stigmatic lines. **Fruit** a large, woody, septifragal capsule, pendulous, valves separating from apex, persistent at base; columella massive, softly woody, 5-angled. **Seeds** 3–5 per locule, with a terminal wing. $x = 9$ or 18 (polyploidy).

Species ± 11 in Africa, 2 in sthn Afr.: *Entandrophragma caudatum* (Sprague) Sprague, Northern Province, *E. spicatum* (C.DC.) Sprague, Namibia.

*Khaya A.Juss. 4159000

Jussieu: 249 (1830); White & Styles: 287 (1963); Pennington & Styles: 515 (1975); Styles & White: 46 (1991).

Large trees, monoecious. **Leaves** paripinnate; leaflets entire. **Flowers** unisexual; in large panicles. **Calyx** 4- or 5-lobed almost to base, imbricate. **Petals** 4 or 5, contorted, erect in open flowers. **Staminal tube** urceolate, bearing 8–10 included anthers or antherodes towards apex and terminated by 8–10 suborbicular, emarginate or irregularly lobed, overlapping appendages alternating with anthers or antherodes. **Disc** in male flowers cushion-shaped, fused to base of pistillodes, less conspicuous in female flowers. **Ovary** 4- or 5-locular, each locule with 12–18 ovules; style head discoid with crenulate margin, upper surface with stigmatic ridges. **Fruit** an erect, subglobose, woody, septifragal capsule opening by 4–6 valves from the apex. **Seeds** 8–18 per locule, narrowly winged all round margin. $x = 10$ or 25 (50).

Species ± 7, Zimbabwe and Mozambique; **Khaya anthotheca* (Welw.) C.DC. (= **K. nyasica* Baker f.), large forest trees, have been planted successfully in sthn Afr.

*Melia L. 4175000

Linnaeus: 384 (1753); White & Styles: 315 (1963); White & Styles: 49 (1986).

Trees or shrubs; indumentum of simple, glandular and tufted-stellate hairs. **Leaves** 2- or 3-pinnate; leaflets crenate or serrate. **Flowers** bisexual and male on same individual (polygamous); in panicles. **Petals** imbricate. **Staminal tube** narrowly cylindrical; anthers 10, shortly apiculate, alternating with a pair of narrowly deltate appendages. **Disc** annular, crenulate, free from ovary and staminal tube. **Ovary** with 4–8 locules, each with 2 superposed ovules; style head capitate with 4–8 short, erect or incurved stigmatic lobes. **Fruit** a 3–8-locular drupe; locules usually 1-seeded. **Seeds** without wing or aril. $x = 7$ (polyploidy).

Species 1: **Melia azedarach* L. in sthn Afr., referred to as Seringa or Persian Lilac; widely planted as ornamentals, and in places it is naturalised and has become a serious invader.

Nymania Lindb. 4168000

Lindberg: 290 (1868); Verdoorn: t. 1454 (1965); Friedrich-Holzhammer: 2 (1968); White: 146 (1986); White & Styles: 39 (1986); Dahlgren & Van Wyk: 56 (1988) as Aitoniaceae.

Aitonia Thunb.: 166 (1781) name illegitimate, not *Aytonia* Forst. & Forst.f. (1776); Harvey: 243 (1860).

Shrubs or small trees. **Leaves** mostly in fascicles on abbreviated short shoots, simple, entire; indumentum of

simple hairs. **Flowers** bisexual, solitary, axillary. **Calyx** 4-lobed to near base. **Petals** 4, imbricate. **Stamens** 8; filaments curved, fused only near base, without appendages; anthers medifixed. **Disc** thin, partly fused to base of staminal tube. **Ovary** 4-lobed, with 4 locules, each with 2 collateral ovules; style exserted with a simple, minute, scarcely expanded style head. **Fruit** a papery, inflated capsule with laterally compressed, wing-like locules, at first suffused with carmine. **Seeds** reniform, minutely verrucose, puberulent. $x = 8$ (aneuploids—1 report, high polyploidy).

Species 1: *Nymania capensis* (Thunb.) Lindb., southern half of Namibia, Northern Cape (Namaqualand and north-central parts), S Western Cape and southern half of Eastern Cape.

Pseudobersama Verdc. 4195010

Verdcourt: 504 (1956); White & Styles: 304 (1963); White & Styles: 57 (1986).

Trees, dioecious; indumentum of simple hairs. **Leaves** imparipinnate; leaflets entire. **Flowers** unisexual; in axillary thyrses. **Calyx** cupuliform, 5-toothed. **Petals** 5, imbricate. **Stamens** 11 or 12; filaments connate at base up to two-thirds of their length; anthers puberulous, dorsifixed; staminodes 12. **Disc** annular, crenulate, partly fused to base of ovary or pistillode. **Ovary** ovoid, slightly (4)5-lobed, (4)5-locular, with 2 ovules in each locule, hirsute; pistillode conical at base, cylindric, 3-locular; style short; stigma capitate. **Fruit** a loculicidal capsule with 4 or 5 thick, woody valves bearing branched, anther-like appendages outside. **Seeds** small, partly covered by a bright red aril.

Species 1: *Pseudobersama mossambicensis* (Sim) Verdc., tropical to subtropical E Africa as far south as northernmost KwaZulu-Natal.

*Toona M.Roem. 4156000

Roemer: 131, 139 (1846); Pennington & Styles: 512 (1975); Styles & White: 45 (1991).

Cedrela P.Browne sect. *Toona* Endl.: 1055 (1840).

Trees, deciduous or semi-evergreen, monoecious. **Leaves** paripinnate; leaflets entire or toothed. **Flowers** unisexual; in large panicles. **Sepals** free or partly united. **Petals** 5, imbricate, adnate at the base by a median carina to the short cushion-shaped androgynophore. **Stamens** 5, free, arising on androgynophore; 1–5 thread-like staminodes sometimes present. **Ovary** 5-locular; locules with 6–10 ovules; style head discoid with glandular stigmatic papillae. **Fruit** a pendulous, thinly woody, ellipsoid or obovoid, septifragal capsule, opening from apex by 5 valves, columella softly woody. **Seeds** winged at one or both ends. $x = 14$ (13) (aneuploids, polyploidy).

Species 2 or more in Old World; **Toona ciliata* M.Roem. planted for timber and ornament, becoming naturalised in eastern parts of sthn Afr.

Trichilia P.Browne 4195000

Browne: 278 (1756) name conserved; Sonder: 246 (1860); White & Styles: 297 (1963); White: 157 (1986); White & Styles: 53 (1986).

Trees or suffrutices, apparently dioecious. **Leaves** imparipinnate; leaflets entire. **Flowers** unisexual; in cymose panicles. **Calyx** 5-lobed. **Petals** 5, imbricate. **Disc** fused to base of staminal tube. **Stamens** 10; filaments connate in lower half, free portion often densely villous, with a pair of lateral appendages at apex. **Ovary** small, sometimes adnate to disc; 2–4-locular with 2 collateral ovules in each locule, villous; style short or long, terete, villous; stigma capitate, globose, or 2–4-lobed. **Fruit** a coriaceous 2–4-locular, 3-valved loculicidal capsule, with 1 or 2 seeds in each locule. **Seeds** large, mostly covered with red fleshy aril. $x = 25?$ (23) (aneuploids, polyploidy).

Species ± 85, fairly cosmopolitan in tropics and subtropics, concentrated in America, 15 in Africa, 2 in Asia; 2 in sthn Afr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Province.

Turraea L. 4171000

Linnaeus: 150 (1771); Sonder: 244 (1860); White & Styles: 307 (1963); White & Styles: 41 (1986).

Nurmonia Harms: 80 (1917).

Trees, shrubs or suffrutices. **Leaves** simple, rarely compound, subsessile or petiolate. **Flowers** bisexual; axillary, solitary or fascicled; bracts many. **Calyx** with campanulate tube, 5-lobed. **Petals** 5, narrowed into a long claw. **Disc** small or 0. **Stamens** 7–10(20); filaments connate into a long, slender tube widening upwards; tube 10-toothed or -lobed, sometimes with lobes fimbriate or 2-partite or -notched; anthers usually shortly apiculate. **Ovary** sessile, sometimes ribbed, with (3)4–10(20) locules, with 2 collateral or superposed ovules in each locule; style exserted, filiform; stigma discoid, capitate, or globose. **Fruit** a (3)4–10(20)-locular loculicidal capsule with each locule 1- or 2-seeded. **Seeds** red or black, subglobose with ± conspicuous orange, red or whitish aril. $x = 25?$

Species ± 50, in Africa, Madagascar Mascarenes and the Comores, and 1 widespread species in the tropical Far East; 6 in sthn Afr., Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape to near Alexandria.

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Melianthaceae

(Rosidae—Sapindales)

Compiled by R.H. Archer

Subshrubs, shrubs or small trees; sometimes with unpleasant smell. **Leaves** alternate, imparipinnate; rachis often winged; stipules connate, intrapetiolar, often large (combination of leaf characters unique for sthn Afr.). **Flowers** usually bisexual, rarely unisexual, irregular, resupinate: petiole twisting through 180° at flowering time; racemose. **Calyx** of 5 unequal segments, imbricate, sometimes one spurred. **Petals** 4 or 5, free, clawed, unequal, imbricate. **Disc** unilateral, lining inside of calyx. **Stamens** 4(5), arising within disc, free or variously connate, often declinate; anthers 2-thecous, opening lengthwise. **Ovary** superior, 4- or 5-locular; style simple, central; stigma globose or simple; ovules erect or pendulous, anatropous, bitegmic, on axile placentas, 1–4 in each locule. **Fruit** a papery or woody capsule, loculicidally 4- or 5-valved or opening only at apex. **Seeds** subglobose; aril present (*Bersama*) or 0; embryo small, straight; endosperm copious.

Genera 2, species ± 14, tropical and sthn Afr.; sthn Afr.: genera 2, species ± 14.

Sonder: 366 (1860); White: 544 (1966); Merxmüller & Roessler: 1 (1968); Dahlgren & Van Wyk: 48 (1988).

Key to genera

Calyx subequal at base; ovules 1 in each locule; leaf rachis not winged ..... **Bersama**
Calyx very oblique at base; ovules 2–4 in each locule; leaf rachis winged ..... **Melianthus**

Bersama Fres. 4853000

Fresenius: 280 t. 17 (1837); Phillips: 33 (1921); White: 544 (1966).

Natalia Hochst.: 663 (1841); Sonder: 369 (1860).

Trees or shrubs. **Leaves**: leaflets 2–many-jugate, with entire or toothed margin. **Flowers** bisexual or sometimes unisexual, in sessile or pedunculate, terminal or lateral, dense or lax, racemes. **Calyx** divided nearly or quite to base, usually hairy. **Petals** 5, unequal, clawed, sometimes with appendages, usually tomentose outside. **Disc** unilateral or semi-annular. **Stamens** 4(5) arising inside disc; filaments connate, hairy. **Ovary** 4- or 5-locular, with a solitary, erect ovule in each locule, villous; style simple, often hairy towards base; stigma globose or subglobose. **Fruit** a globose or elliptic, leathery or woody capsule, often covered with protuberances, 4- or 5-valved. **Seeds** subglobose, sometimes keeled or angled, black or reddish, with a yellow, waxy aril. $x = 19$.

Species ± 8, Africa, ± 4, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Melianthus L. 4854000

Linnaeus: 639 (1753); Sonder: 367 (1860); Phillips & Hofmeyer: 351 (1927); Dyer: t. 1140 (1952); Dyer: t. 1310 (1959); Tansley & Schelpe:143 (1984).

Shrubs or undershrubs, often with unpleasant smell. **Leaves**: rachis winged; leaflets unequally sided, toothed, glabrous or hairy. **Flowers** generally bisexual, usually conspicuous, solitary, 2–4 together at nodes, or in racemes. **Calyx** 5-partite, large, asymmetric, with or without a saccate gibbosity at base, hairy within and without. **Petals** 4(5), spatulate with hairy claw. **Disc** large, unilateral, variously adnate to sepals. **Stamens** 4, arising inside nectary, didynamous; filaments free. **Ovary** 4-lobed, 4-locular, with 2–4 ovules in 2 rows in each locule; style persistent, usually hairy at base. **Fruit** a membranous, woody or leathery capsule, 4-lobed or 4-winged, glabrous or hairy. **Seeds** black, shiny, without an aril. $x = 18, 19$ (1 report each).

Species 6, sthn Afr., widespread in both dry and moist areas.

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Menispermaceae

(Magnoliidae—Ranunculales)

Compiled by M. Jordaan

Woody, twining vines or lianas, sometimes with tendrils, or rarely erect shrubs, rarely herbaceous; wood in cross section showing broad, medullary rays; plants dioecious. **Leaves** alternate, usually simple, sometimes peltate, rarely trifoliolate, petiolate; stipules 0. **Inflorescences** panicles, racemes, sometimes cymose heads, many-flowered, rarely solitary or paired, axillary or borne on leafless twigs, often less ramified in female specimens. **Flowers** unisexual,

regular, rarely slightly irregular, usually small and inconspicuous, rarely deeply coloured. **Male flowers**: sepals (1)3–12 or more, usually in whorls of 3, rarely 1, free or slightly connate, imbricate or valvate; petals (0)1–6, free or connate, usually imbricate; stamens (2)3–6 or more, free or variously connate; anthers dehiscing by longitudinal, rarely by transverse, slits. **Female flowers** similar to male, sometimes less numerous; staminodes present or 0; carpels 1, 3–6 or more, free; ovules 2 in each carpel, attached to ventral suture, soon reduced to 1 by abortion; stigma sessile on a very short style. **Fruit** a 1-seeded drupe with scar of style subterminal or near base by eccentric growth; exocarp subcoriaceous or membranous; mesocarp ± fleshy or fibrous; endocarp woody or bony, outside rugose, tuberculate, echinate, or ridged, often with an intrusion of the placenta (condyle). **Seed** often curved and horseshoe-shaped; endosperm 0 or present, ruminate or not.

Genera ± 71; species ± 450, widespread in tropical and subtropical lowlands of the Old and New World, with relatively few species in temperate regions; sthn Afr.: genera 7, species 13.

Jussieu: 284 (1789); Candolle: 95 (1824); Bentham: 30 (1862); Miers: 1 (1871); Baillon: 1 (1874); Prantl: 78 (1891); Troupin: 1 (1962); Kessler: 402 (1993).

Key to genera

1a Carpel 1; filaments united into a column or suppressed:
  2a Leaves clearly peltate ..... **Stephania**
  2b Leaves not peltate to subpeltate:
    3a Lianas; sepal usually 1 in female flower ..... **Cissampelos**
    3b Erect subshrubs, spiny; sepals always 2 in female flowers ..... **Antizoma**
1b Carpels 3(6) or 4–12(–30); filaments free or variously connate, rarely (in *Albertisia*) forming a column:
  4a Carpels 3 or 6; sepals and petals 6; filaments free or partly connate:
    5a Anthers dehiscing by longitudinal slits; stems brittle; filaments sometimes partly connate ..... **Tinospora**
    5b Anthers with transverse dehiscence; stems not brittle; filaments free ..... **Cocculus**
  4b Carpels 4–12(–30); sepals 6–12; petals 3, 6 or 0; filaments at least partly connate:
    6a Inner sepals connate; filaments connate into a solid column, with synandrium 15–30-locular; condyle 0 ..... **Albertisia**
    6b Inner sepals free; filaments 3 or 6, connate to ± the middle; condyle narrowly obovate ..... **Tiliacora**

Key to genera based on structure of endocarp (after Botha 1980a)

1a Endocarp horseshoe-shaped; condyle linear, narrowly obovate, obovate or ± circular:
  2a Condyle ± circular, with perforation usually conspicuous ..... **Cocculus**
  2b Condyle linear, narrowly obovate or obovate; perforation very small or 0:
    3a Condyle narrow or linear; laterally somewhat convex; surface of endocarp ± smooth, without prominent knobs or tubercles ..... **Tiliacora**
    3b Condyle narrowly obovate or obovate; laterally somewhat concave; surface of endocarp usually with prominent ridges, knobs, scales or tubercles:
      4a Condyle obovate; septum smooth, unperforated; dorsal ridge conspicuous ..... **Stephania**
      4b Condyle narrowly obovate; septum somewhat rough, often perforated; dorsal ridge inconspicuous or 0:
        5a Radial ridges or plates prominent and ± perpendicular to the surface of the endocarp, or flattened and wrinkled; lateral girdle, adjacent to the condyle, fairly smooth ..... **Cissampelos**
        5b Radial ridges either flowing into one another, or scale-like and pointing towards the condyle, or sometimes warty; lateral girdle, adjacent to the condyle, fairly rough in texture ..... **Antizoma**
1b Endocarp not horseshoe-shaped; condyle 0 or in the form of an enclosed globular cavity within the endocarp:
  6a Condyle 0; endocarp parchment-like, wrinkled ..... **Albertisia**
  6b Condyle in the form of an enclosed globular cavity within the endocarp; endocarp bony ..... **Tinospora**

Albertisia Becc. 2619000

Beccari: 161 (1877); Prantl: 89 (1891); Forman: 82 (1975); Kessler: 408 (1993).

Epinetrum Hiern: 21 (1896); Diels: 95 (1910); Troupin: 4 (1956); Troupin: 151 (1960); Troupin: 28 (1962); Troupin & Gonçalves: 3 (1973).

Suffrutescent, twining lianas with greyish hairs. **Leaves** simple, broadly elliptic. **Inflorescences** with male flowers small, in 1–many-flowered condensed axillary cymules, solitary or 2 together, subsessile or pedunculate; female flowers axillary, usually solitary. **Male flowers**: sepals 6–12, outer 6–9 in 1 or 2 whorls, free, imbricate, bract-like, 3 innermost larger, coriaceous, valvate, connate into a fleshy corolliform tube; petals 3, 6 or 0, truncate-reniform, fleshy; stamens connate into a 15–30-locular synandrium, conical, stipitate; anthers with transverse dehiscence. **Female flowers** similar to male; staminodes 6; carpels 4–12, hairy. **Drupe** ellipsoid; exocarp echinulate; endocarp crustaceous or thinly woody, slightly wrinkled; condyle 0. **Seed** without endosperm; embryo straight; cotyledons very thick.

Species ± 17, in tropical and subtropical Africa 12, in SE Asia 5; 1 in sthn Afr.: *Albertisia delagoensis* (N.E.Br.) Forman, N KwaZulu-Natal; on littoral sand.

Antizoma Miers 2573000

Miers: 41 (1851); Prantl: 84 (1891); Harvey: 11 (1860); Friedrich-Holzhammer: 2 (1968); Botha: 1 (1980b); Kessler: 416 (1993).

Shrubs, scandent, prostrate or suberect. **Leaves** simple, usually oblong or linear, occasionally ovate or reniform, often with a dorsal, basal spur. **Inflorescences** with male flowers in few-flowered cymes; female flowers paired to solitary. **Male flowers**: sepals 4, cuneate-obovate, sometimes white-woolly; petals 4, connate into saucer-shaped corolla; stamens 4–10, connate into a column, expanded and peltate above; anthers in a marginal ring on disc of staminal column, with transverse dehiscence. **Female flowers**: sepals 2; petals 2, opposite sepals; staminodes 0; carpel 1; style 0; stigma lobed. **Drupe** subovoid, sometimes curved by unequal development, with stigma towards base; endocarp horseshoe-shaped, with

warty ridges, dorsal ridge absent; condyle narrowly obovate. **Seed** with endosperm not ruminate; embryo horseshoe-shaped; cotyledons appressed.

Species 2, dry regions of sthn Afr., widespread, Namibia, Botswana, the northern provinces, Free State, KwaZulu-Natal, Northern and Western Cape.

Cissampelos L. 2574000

Linnaeus: 1031 (1753) in part; Linnaeus: 455 (1754) in part; Jussieu: 285 (1789); Candolle: 531 (1817) in part; Candolle: 100 (1824) in part; Harvey: 10 (1860) in part; Bentham: 37 (1862) in part; Miers: 128 (1866); Oliver: 45 (1868); Miers: 127 (1871); Baillon: 41 (1872); Prantl: 84 (1891); Engler: 394 (1899); Diels: 283 (1910); Troupin: 137 (1955); Troupin: 23 (1956); Troupin: 165 (1960); Troupin: 262 (1962); Forman: 355 (1968); Friedrich-Holzhammer: 3 (1968); Troupin & Gonçalves: 18 (1973); Benvenuto: 63 (1974); Rhodes: 415 (1975); Kessler: 416 (1993); Thulin: 28 (1993).

Twining lianas, sometimes rambling shrubs or perennial herbs, rarely erect. **Leaves** simple, sometimes subpeltate, ovate or cordate, entire or angular. **Inflorescences** axillary, with male flowers in paniculate cymes; female flowers in corymbose cymules which are either solitary or clustered or arranged in ± false racemes, less developed than male flowers. **Male flowers**: sepals (3)4(5), obovate, often spreading, mostly dorsally pilose; petals 2–4, connate into a cup- or saucer-shaped corolla; stamens connate into a 4–10-locular synandrium, expanded and peltate above; anthers sessile, in a marginal ring on disc of staminal column, with transverse dehiscence. **Female flowers**: sepal 1, rarely more, obovate, dorsally pilose; petal 1, rarely 2 or 3, smaller than sepal and alternating with sepals, both often deciduous; staminodes 0; carpel 1, ± villous; stigma 3-fid. **Drupe** subglobose, often pilose, bent so that apex with stigma approaches pedicel; endocarp bony, horseshoe-shaped, with 1 dorsal ridge, sides with small transverse often verrucose ribs; condyle narrowly obovate. **Seed** with sparse endosperm; embryo curved; cotyledons appressed. $x = 12$.

Species ± 20, North and South America, Asia, tropical and sthn Afr., as well as Madagascar; 4 in sthn Afr., fairly widespread (except Free State and Lesotho); in forest, scrub and deciduous bushland.

Cocculus DC. 2570000

Candolle: 515 (1817) name conserved; Candolle: 96 (1824); Miers: 43 (1851); Bentham: 36 (1862); Miers: 249, t. 124 (1871); Baillon: 33 (1872) in part; Prantl: 84 (1891); Diels: 227 (1910); Troupin: 10 (1956); Troupin: 163 (1960); Troupin: 221 (1962); Friedrich-Holzhammer: 4 (1968); Troupin & Gonçalves: 16 (1973); Benvenuto: 35 (1974); Kessler: 417 (1993); Thulin: 26 (1993).

Scandent shrubs or climbers, rarely prostrate or erect, sometimes fleshy. **Leaves** simple, entire or lobed, sometimes falling before flowering. **Inflorescences**: axillary cymes, rarely flowers solitary in female. **Male flowers**: sepals 6 or 9, in 2 or 3 whorls, outer ones smaller, often pilose; petals 6, entire or bifid, concave or involute around stamens; stamens 6 or 9, free; anthers with a transverse dehiscence. **Female flowers** similar to male; staminodes 6 or 0; carpels (3)4–6, ± ovoid; ovule solitary; style cylindrical, erect or recurved, or stigmas sessile and recurved. **Drupe** obovate or subspherical-compressed, with persistent style or stigma; endocarp bony, horseshoe-shaped, transversely ridged; condyle ± circular, septum usually perforated. **Seed** curved; endosperm present as a thin layer, not ruminate. $x = 13$ (aneuploids, polyploidy, B-chromosomes).

Species ± 10, tropical to temperate North America, Africa, Socotra and Asia to Australia; 1 in sthn Afr.: *Cocculus hirsutus* (L.) Diels, Namibia, Botswana, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Stephania Lour. 2572000

Loureiro: 608 (1790); Bentham: 37 (1862); Miers: 12 (1866); Oliver: 46 (1868); Miers: 210 (1871); Baillon: 42 (1872); Prantl: 84 (1891); Diels: 259 (1910); Troupin: 20 (1956); Troupin: 69 (1960); Troupin: 237 (1962); Troupin & Gonçalves: 24 (1973); Benvenuto: 50 (1974); Kessler: 415 (1993).

Homocnemia Miers: 36 (1851) ex Harv.: 10 (1860).

Woody or rarely herbaceous lianas, sometimes with succulent stems. **Leaves** simple, peltate, triangular, ovate or suborbicular. **Inflorescences**: umbelliform cymes, which are sometimes condensed to disciform capitula, often cauliflorous, rarely panicles. **Male flowers**: sepals 6 or 8, in 2 whorls, mostly subequal, concave, obovate; petals 3(4), free, similar to sepals, rarely 0; stamens 2–6, arranged in a disc-shaped stalked synandrium; anthers sessile, confluent into a single ring around margin, with transverse dehiscence. **Female flowers** similar to male, but sepals 1–8, free; petals 2–4, free; staminodes usually 0; carpel 1; style small or 0; stigma shortly lobed or divided into 3–6 branches. **Drupe** with exocarp smooth, glabrous or hairy; endocarp bony, horseshoe-shaped, laterally concave with 2–4 longitudinal rows of tubercles or transverse ridges; condyle obovate, somewhat concave on either side with its septum smooth, imperforate. **Seed** curved, with endosperm; cotyledons appressed. $x = 11, 12, 13$.

Species ± 30, in tropical Africa 5, in S India to Middle and South China to New Guinea 25; 1 in sthn Afr.: *Stephania abyssinica* (Dill. & Rich.) Walp. with 2 varietal forms from tropical Africa to sthn Afr., widespread, except Namibia and Botswana.

Tiliacora Colebr. 2577000

Colebrooke: 53 (1822); Miers: 36 (1851); Bentham: 36 (1862); Oliver: 43 (1868); Baillon: 34 (1872); Prantl: 85 (1891); Engler: 400 (1899); Diels: 59 (1910); Troupin: 7 (1956); Troupin: 153 (1960); Troupin: 47 (1962); Troupin & Gonçalves: 6 (1973); Forman: 89 (1975); Kessler: 411 (1993); Thulin: 26 (1993).

Robust lianas, glabrous. **Leaves** simple, ovate or ovate-lanceolate, entire, penninerved, with nerves prominent below, the two lateral basal ones often especially so. **Inflorescences** variably dense pseudoracemes, often cauliflorous, few-flowered, axillary or from old stems, or in axillary, solitary, sometimes 1-flowered cymules. **Male flowers**: sepals 6–12, outer bract-like, outermost smaller than inner 3, ± fleshy or coriaceous; petals 3–6; stamens 3–9, free or ± connate; anthers introrse, with oblique or longitudinal dehiscence. **Female flowers** similar to male; staminodes 0; carpels (3–)8–12(–30), borne on an apparent gynophore. **Drupelets** ovoid, stipitate, with remains of stigma near stipe; exocarp glabrescent, smooth or verrucose; endocarp bony, horseshoe-shaped, without prominent ridges or tubercles; condyle narrowly obovate. **Seed** with endosperm ruminate, sparse or 0; embryo curved; cotyledons fleshy, appressed, often unequal. $x = 13$ (12) (1 report).

Species ± 20, in Old World tropical regions, mainly in Africa, 2 in SE Asia; 1 in sthn Afr.: *Tiliacora funifera* (Miers) Oliv., Mpumalanga and N KwaZulu-Natal.

Tinospora Miers 2583000

Miers: 35 (1851); Bentham: 34 (1862); Miers: 30 (1871); Prantl: 87 (1891); Engler: 402 (1899); Diels: 133 (1910); Troupin: 17 (1956); Troupin: 159 (1960); Troupin: 191 (1962); Troupin & Gonçalves: 13 (1973); Kessler: 413 (1993); Thulin: 28 (1993).

Desmonema Miers: 260 (1867) not of Raf.: Miers: 377 (1871); Engler: 408 (1899); Diels: 153 (1910). *Hyalosepalum* Troupin: 430 (1949).

Herbaceous or woody lianas, sometimes small rambling shrubs, or sometimes stems ± succulent and brittle. **Leaves** cordate, simple, entire, occasionally dentate, palmately 5–7-nerved, rarely pinnate, with long petioles.

Inflorescences: pseudopanicles, pseudoracemes or pseudospikes, 2–4-flowered or flowers solitary. **Male flowers**: sepals 6 (occasionally 1–3 additional, minute, outer ones present), usually free, rarely united at base, outer 3 smaller than inner, hyaline or membranous; petals (3)6, fleshy, involute, embracing filaments, inner 3 shorter than outer which are shorter than inner sepals; stamens (3)6; filaments free or usually connate to ± middle; anthers erect, dehiscing by longitudinal slits. **Female flowers** similar to male; staminodes 6 or 0, opposite petals; carpels 3; ovary obliquely ovoid; stigma sessile, oblique. **Drupelets** 3 or fewer; unequally ovoid; exocarp pulpy; endocarp bony, ovoidal or ellipsoidal, often ± verrucose or tuberculate outside, often with a few teeth; condyle a deep globular cavity on ventral side. **Seed** with endosperm fleshy, ruminate; embryo reniform; cotyledons foliaceous, divaricate. $x = 12, 13$.

Species ± 35; in tropical Africa 7, in Madagascar 2, in Asia to Australia and the Pacific 23; 3 in sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

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Menyanthaceae

(Asteridae—Asterales)

Compiled by C.L. Bredenkamp

Perennial or annual herbs, aquatics or wetland plants, often with tufted rootstocks or rhizomes. **Leaves** alternate, basal or subopposite, simple; petioles often long, sheathing at base; blade ovate-oblong to orbicular, stipules 0. **Inflorescence** of simple or branched racemes or cymes, or flowers fascicled at nodes, in pairs or solitary. **Flowers** bisexual, regular, often heterostylous. **Sepals** 5(6), united at base. **Petals** 5, united at base, often fimbriate. **Stamens** 5, united to petals, arising at or below corolla throat; anthers with longitudinal slits. **Ovary** superior, 1-locular with 2 parietal placentas, with 2–many ovules. **Fruit** a capsule. **Seeds** 2–many.

Genera 5, species 40–50, cosmopolitan; sthn Afr.: genera 2, species 6.

Marais & Verdoorn: 241 (1963) under Gentianaceae; Aston: 2 (1969); Raynal: 412 (1974a); Cook: 128 (1990); Mackinder: 51 (1990).

Key to genera

Inflorescence a cluster of pedicellate flowers; fruit indehiscent or splitting irregularly ..... **Nymphoides**
Inflorescence cymose; fruit dehiscing by 4 valves ..... **Villarsia**

Nymphoides Ség. 6545000

Séguier: 121 (1754); Aston: 2 (1969); Raynal: 122 (1971); Raynal: 227 (1974a); Raynal: 405 (1974b); Cook: 128 (1990); Mackinder: 51 (1990).

Limnanthemum S.G.Gmel.: 527 (1769).

Aquatic herbs, annual or perennial. **Leaves** in a rosette on the rootstock, or alternate along floating stolons; blade circular to ovate, with a sinus at the base. **Flowers** clustered at nodes, pedicellate, subtended by a small bract; sometimes heterostylous. **Sepals** triangular. **Petals**

mostly fimbriate inside, often with crested midnerve and margins, white or yellow. **Capsule** developing under water, sometimes regularly dehiscent but often opening irregularly or indehiscent. **Seeds** few to many, round to oval, flattened or convex, smooth to tuberculate. $x = 9$ (2, 8, 10) (polyploidy).

Species ± 20, Africa, Asia, East Indies, Australia and New Zealand; 5 in sthn Afr., Namibia, Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Villarsia Vent. 6544000

Ventenat: t. 9 (1803) in part, name conserved; Hill & Prain: 1119 (1909); Marais & Verdoorn: 242 (1963); Aston: 2 (1969); Cook: 128 (1990).

Semi-aquatic herbs; stems simple or branched. **Leaves**: basal ones long-stalked, entire or irregularly dentate; cauline ones alternate when present, but usually absent or much reduced and distant. **Flowers** in lax or congested cymose, sometimes paniculate inflorescences. **Calyx** deeply 5-lobed. **Corolla** 5-lobed; tube short, white or yellow. **Stamens** arising on corolla tube. **Ovary** 1-locular, with minute, basal glands; placentas thickened. **Capsule** 4-valved, splitting at apex. **Seeds** 2. $x = 9$ (polyploidy).

Species ± 16, SE Asia, Australia and sthn Afr.; 1 in sthn Afr.: *Villarsia capensis* (Houtt.) Merrill, Western Cape, in marshes.

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Mesembryanthemaceae

(Caryophyllidae—Caryophyllales)

Compiled by P. Chesselet, G.F. Smith, P.M. Burgoyne, C. Klak, S.A. Hammer, H.E.K. Hartmann, H. Kurzweil, E.J. van Jaarsveld, B-E. van Wyk & O.A. Leistner

Annual to perennial succulents, ranging from minute to compact and tufted to prostrate to decumbent; herbs, dwarf-shrubs, subshrubs or shrubs, rarely spiny. **Leaves** opposite, rarely alternate, simple, free at base to almost completely united into single, conical to ± spherical bodies, often sheathing stem, flat to 3-angled to cylindric, all similar (plant homophyllous) or different types of leaf pairs present (plant heterophyllous, e.g. Mitrophyllum Group), members of a leaf pair similar (plant isophyllous) or dissimilar (plant anisophyllous), surface heterocellular (with cells of different sizes) or homocellular (cells of similar size), ephemeral to persistent, with or without bladder cells, sometimes tuberculate or punctate; stipules 0. **Flowers** bisexual, regular, in cymose inflorescences, sometimes representing ± entire plant, to solitary. **Calyx** 4–6-lobed, sometimes forming a short tube above ovary. **Corolla** of many ± linear petals of staminodial origin, either free or shortly connate at base. **Stamens** many, often surrounded by few to many filamentous staminodes. **Nectary** either koilomorphic: represented by usually 4 or 5 shell-shaped depressions (in Mesembryanthemoideae), or lophomorphic: raised into a crested ring, continuous or broken into ± 5 crested glands (in Ruschioideae). **Ovary** inferior to half-inferior (in Mesembryanthemoideae), (3, 4)5(–25)-locular; placentas ranging from axile through basal to parietal; ovules usually many; style 0; stigmas usually as many as locules, subulate to filiform, sometimes fused at base, sometimes plumose. **Fruit** a loculicidal capsule, splitting open when dry or mostly when wetted by means of hygroscopic expanding keels, rarely schizocarpic with winged or nut-like mericarps, or fleshy and indehiscent; valves with or without wings, expanding keels parallel to divergent, locules open or with covering membranes, closing bodies blocking distal exits of locules present or 0. **Seeds** ± reniform, glossy to rugose or papillate and rough, black to brown to pale cream; embryo curved around perisperm.

Genera ± 123, species ± 1 680, mostly in the southwestern parts of the African continent, from ± 16° N in Angola down to the Western Cape Province, extending well into the east over the central plateau of South Africa and reaching into Zimbabwe and Botswana; sthn Afr.: genera ± 122, species ± 1 662. Outside this core area, several species of *Delosperma* are found from N Tanzania up to the Yemen and also in the Arabian Peninsula and Madagascar. A few species of *Mesembryanthemum* occur around the Mediterranean Sea, and most species of the genus *Disphyma* are found in Australia, New Zealand and the adjacent islands. The genus *Sarcozona* and some species of *Carpobrotus* are restricted to Australia, but species of *Ruschia* and *Lampranthus* may not be indigenous to Australasia. It is also not clear whether species of *Malephora* and *Carpobrotus* are recent introductions to South America, but the populations of *Carpobrotus* found along the west coast of North America were certainly introduced by man.

Schwantes: 1 (1957); Friedrich: 1 (1970); Herre: 1 (1971); Hartmann: 313 (1988a); Hartmann: 75 (1991a); Hartmann: 95 (1991b); Hartmann: 37 (1993); Chesselet *et al.*: 197 (1995); Hammer: 195 (1995c); Smith *et al.*: 1 (1998).

CLASSIFICATION OF FAMILY

Mesembs are currently classified in Aizoaceae Rudolfi *sensu stricto*, excluding Molluginaceae (Bittrich & Hartmann 1988; Hartmann 1993). This concept of Aizoaceae comprises five subfamilies: Mesembryanthemoideae Ihlenf., Schwantes & Straka, Ruschioideae Schwantes in Ihlenf., Schwantes & Straka emend. Bittrich & H.E.K.Hartmann, Aizooideae, Sesuvioideae Lindl. and Tetragonioideae Lindl. The monophyly of the first two subfamilies, at times referred to as "Mesembryanthema", is supported by the following synapomorphies: semi-epigynous or epigynous flowers, petals of staminodial origin, raphide crystals of calcium oxalate, and n = 9. The Aizoaceae *sensu stricto*, excluding Mesembryanthemaceae, is supported by: perianth petaloid on inside, sepaloid on outside, druse crystals of calcium oxalate, and n = 8. The entire Aizoaceae rests on one apomorphy: the evolution of epidermal bladder cell idioblasts. The development of simple hygrochastic or hygroscopic capsules with septal expanding tissue has been suggested as another possible synapomorphy for the Aizoaceae *sensu stricto*.

Recent investigation of evolutionary relationships within Aizoaceae *sensu lato* (Wallace 1998), using comparative plastid DNA sequencing (*rpl16* intron), showed the mesembs to be monophyletic and derived relative to the other groups. The clade represented by *Sesuvium* was found to be basal in the family with *Tetragonia* and *Aizoon* as sister to one another.

The outmoded family name Mesembryanthemaceae Fenzl is legitimate: the mesembs were given family status by Herre & Volk (1948). It is a convenient concept and its continued usage is supported by the sheer size of the group (± 123 genera (incl. *Sarcozona*), ± 1 680 species), its monophyly, distinctive traits, and distribution—being almost entirely endemic to sthn Afr.

SUPRAGENERIC CLASSIFICATION

The classification of the Mesembryanthemaceae formulated by Schwantes, subsequently revised and completed by Straka and Ihlenfeldt (Herre 1971), represents the last formally published classification of the mesembs. Bittrich (1986); Gerbaulet (1995, 1996a, 1996b, 1996c, 1997) and Klak & Linder (1998) have done extensive work on the Mesembryanthemoideae, yet at this stage no revised tribal or subtribal classification is available for this group. Changes in rank and clarification of generic boundaries have been the focus of several of these studies.

In the Ruschioideae, a number of monophyletic groups are recognised, yet relationships among genera as well as delimitation of genera are still under study and a formal suprageneric classification is not available for this large group which contains approximately 1598 species. Hartmann (1988a; 1991a; 1993; 1998a) has proposed a provisional system for grouping ruschioid genera, drawing on extensive studies of fruit and flower morphology, epidermal characters, growth form, and seed. The system outlined below is based on these works.

Subfamily **MESEMBRYANTHEMOIDEAE**

Genera classified in the subfamily Mesembryanthemoideae share the following characters: stamens and petals (mostly) forming a tube; nectaries koilomorphic (shell-shaped); cortical bundles present; expanding tissue present as expanding keels extending from centre of capsule to tips of valves.

Aptenia, Aridaria, Aspazoma, Brownanthus, Caulipsolon, Dactylopsis, Mesembryanthemum, Phyllobolus, Prenia, Psilocaulon, Sceletium, Synaptophyllum.

Subfamily **RUSCHIOIDEAE**

In the Ruschioideae synapomorphies include: stamens hairy at base; nectaries lophomorphic (crest-shaped); placentation basal or parietal; expanding keels ± restricted to valves; covering membranes often present.

The Ruschioideae may be subdivided into the following groups (a question mark indicates uncertain classification):

1. Apatesia Group

Plants annual to perennial. Leaves mostly flat, only some bladder cells along the leaf margins. Flowers with a flat, broad nectariferous ring. Capsules with expanding tissue reduced or absent, sometimes breaking into mericarps, often with seed pockets derived from false septa, rarely nuts.

Apatesia, Carpanthea, Caryotophora, Conicosia, Hymenogyne, Saphesia, Skiatophytum.

2. Cleretum Group

Plants annual. Leaves flat, with prominent bladder cells. Flowers with a flat, broad nectariferous ring. Capsules with or without covering membranes, with or without spongy sills (as closing bodies) at the outer rim of the distal opening, expanding sheets predominant, their extension related directly to the size of the covering membranes.

Aethephyllum, Cleretum, Dorotheanthus.

3. Mitrophyllum Group

Plants perennial, heterophyllous, rarely homophyllous, with two leaf pairs per season, sometimes anisophyllous, with prominent bladder cells. Flowers with a lophomorphic nectary ring, rarely reduced. Capsules with complete or reduced covering membranes of constant shape, expanding sheets merging into expanding keels, rarely separate, with or without spongy closing sills or bodies, with broad rectangular valve wings.

Dicrocaulon, Diplosoma, ?Disphyma, ?Glottiphyllum, ?Hammeria, Jacobsenia, Meyerophytum, Mitrophyllum, Monilaria, Oophytum.

4. Delosperma Group

Plants perennial. Leaves terete to trigonous, rarely flat, with ± prominent bladder cells and/or hairs. Flowers with 5 separate lophomorphic nectaries, with filamentous staminodes, rarely without. Capsules with or without covering membranes, expanding keels and sheets separated, rarely merging, closing bodies absent, valve wings present, broad, rectangular, often with basal seed pockets.

Corpuscularia, Delosperma, Drosanthemum, Ectotropis, Gibbaeum, Lampranthus p.p., ?Malephora, Mestoklema, Muiria, Oscularia, Trichodiadema.

5. Stomatium Group

Plants perennial, rhizomatous with enlarged rootstocks. Leaf pairs 2 or 3 to a branch, leaves homocellular, xeromorphic, crystals in irregular zones, surface rough or warty from elevations above subhypodermal tannin idioblasts, often denticulate. Flowers with five separate nectaries. Capsules with or without covering membranes, without closing bodies, valve wings broad to reduced.

Chasmatophyllum, Faucaria, ?Frithia, ?Mossia, Neohenricia, Orthopterum, Rabiea, Rhinephyllum, Stomatium.

6. Titanopsis Group

Plants perennial, with fleshy tap roots, rarely with fibrous roots, but often with fleshy rhizomes. Leaves in rosettes or only one pair per branch, surface homocellular, xeromorphic, crystal layer in certain areas often predominant, smooth or warty. Flowers solitary, with a lophomorphic nectary ring. Capsules without or with covering membranes, these bending later into the empty locules along a preformed line, with broad valve wings tapering towards the tip of the valve, without or with very small closing bodies.

Aloinopsis, Deilanthe, Didymaotus, Dinteranthus, Ihlenfeldtia, Lapidaria, Lithops, Nananthus, Schwantesia, Tanquana, Titanopsis, Vanheerdea, Zeuktophyllum.

7. Dracophilus Group

Plants perennial. Leaves heterocellular, xeromorphic, surface rarely sticky. Flowers mostly solitary, with a lophomorphic nectary ring, rarely five separate glands; without, rarely with filamentous staminodes. Capsules mostly 5-locular, with or without covering membranes, without closing bodies, with broad valve wings.

Conophytum, Dracophilus, Hartmanthus, Jensenobotrya, Juttadinteria, Namibia, Nelia, Psammophora, Ruschianthus.

8. Bergeranthus Group

Plants perennial. Leaves homocellular, xeromorphic, mostly free to the base. Flowers mostly in exserted inflorescences, with five separate nectaries. Capsules with firm, straight, complete covering membranes, closing bodies present or absent, valve wings reduced.

Bergeranthus, Bijlia, Carruanthus, Cerochlamys, Hereroa, Machairophyllum, Rhombophyllum.

9. Lampranthus Group

Plants perennial. Leaves free, homocellular, mesomorphic to xeromorphic, crystal layer thin to absent. Flowers with five separate nectaries, sometimes united into a ring. Capsules deep, with firm, complete covering membranes with additional closing devices at their distal recurved ends, opening blocked by sterile funicles, fruit rarely a berry.

Antegibbaeum, Braunsia, ?Carpobrotus, Circandra, Enarganthe, Erepsia, Esterhuysenia, Lampranthus s.s., Nanaquanthus, Scopelogena, Smicrostigma, Vlokia, Wooleya.

10. Ruschia Group

Plants perennial. Leaves free to connate, surfaces homocellular, xeromorphic, crystal layer thick. Flowers with filamentous staminodes and a lophomorphic nectary ring. Capsules with firm, complete, ± convex covering membranes with closing rodlets at their distal recurved ends, with closing bodies up to medium size, valve wings usually absent; fruit rarely nutlets.

Acrodon, Arenifera, Astridia, Ebracteola, Khadia, Marlothistella, Polymita, Ruschia s.s., Stayneria.

11. Leipoldtia Group

Plants perennial. Leaves free to connate, homocellular, xeromorphic, crystal layer of fine granules, often like sand. Flowers with or without filamentous staminodes, with a lophomorphic nectary ring. Capsules with firm, resilient, ± concave covering membranes with closing ledges, bulges or rodlets at the ± prominent distal recurved ends, closing bodies large, rarely small, rarely absent.

Antimima, Argyroderma, Cephalophyllum, Cheiridopsis, Cylindrophyllum, Fenestraria, Hallianthus, Jordaaniella, Leipoldtia, Octopoma, Odontophorus, Ottosonderia, Pleiospilos, Schlechteranthus, Vanzijlia.

12. Eberlanzia Group

Stems whitish. Capsules with valve wings and closing bodies which are mostly small and often deep inside the locules so that they appear absent.

Amphibolia, Eberlanzia, Ruschianthemum, Stoeberia.

Genera of uncertain classification

Although the following genera have been assigned to groups, these placings are to some extent tentative.

Carpobrotus, Disphyma, Frithia, Glottiphyllum, Hammeria, Malephora, Mossia. Calamophyllum was left out of the classification and the keys because it is insufficiently known.

CLASSIFICATION OF FRUIT

With few exceptions, loculicidal, hygrochastic capsules, which repeatedly open when wet, and close when dry, are characteristic of the Mesembryanthemaceae. Schwantes' (1952) early work on mesemb fruits was refined by Hartmann (1988a) who described nine unique functional syndromes for fruit capsules of the entire group. This system is followed in the generic treatment below.

Guide to fruit types

1a Seeds/funicles axile; expanding keels extending from central axis of capsule to tips of valves..... **Mesembryanthemum type**

1b Seeds/funicles ± parietal, rarely axile (*Caryotophora*, *Hymenogyne*) but then fruits schizocarpic; expanding keels not extending to central axis or absent:

2a Valve wings narrow or absent, or fruits schizocarpic or fleshy and indehiscent; closing bodies present or represented by bunches of sterile funicular hairs:

3a Covering membranes absent or fruit schizocarpic..... **Apatesia type**

3b Covering membranes well developed or fruit fleshy and indehiscent:

4a Closing bodies small, rod-shaped..... **Ruschia type**

4b Closing bodies absent but represented by bunches of sterile funicular hairs..... **Lampranthus type**

2b Valve wings broad; closing bodies absent or large, or sometimes developed from a broad base in the shape of a ledge, boss or bracket; or represented by bunches of funicular hairs:

5a Expanding keels ± in the form of broad, ± flat sheets and appressed to valves..... **Mitrophyllum type**

5b Expanding keels markedly raised, not merging into expanding sheets:

6a Closing bodies large, distinctly stalked, often whitish; capsule often with 10 or more locules..... **Leipoldtia type**

6b Closing bodies absent, or small, or represented by bunches of sterile funicular hairs; capsules seldom with up to 10 locules:

7a Expanding keels parallel, radial..... **Delosperma type**

7b Expanding keels divergent:

8a Exits of locules blocked by bunches of funicular hairs..... **Lampranthus type**

8b Exits of locules without closing devices:

9a Covering membranes flat..... **Drosanthemum type**

9b Covering membranes with boundaries of central parts slightly raised into ridges; margins of distal parts bent into locules..... **Titanopsis type**

Mesembryanthemum type

Expanding keels strictly septal, radial on valves and reaching the central axis (in closed fruit). Expanding sheets absent. Covering membranes absent. Closing bodies absent. Valve wings broad, entirely connate to valves.

Mitrophyllum type

Expanding sheets dominant, transgrading into an expanding keel in central valvar position; consequently expanding keels ± flat and appressed to valves. Covering membranes derived from parts of valvar endocarp that do not develop into expanding tissue, simple, translucent, persistent in shape, ± flat with an inconspicuous marginal edge from inner endocarpal tissue. Closing bodies infrequently developed from a broad base in the shape of a ledge, boss or bracket consisting of spongy cutinised tissue situated above the placenta and below the expanding sheet which diminishes on the closing bodies or bosses. Valve wings broad.

Apatesia type

Expanding sheet predominant but expanding properties reduced. Covering membranes absent. Valve wings absent.

Drosanthemum type

Expanding keel distinct from expanding sheet, divergent over the valves with a ± free, radial elongation, the keel-awn broadened towards the centre of the valve. Covering membranes compound: proximal part derived from valvar endocarp including the epidermis, marginal parts derived from inner endocarpal tissue (the complementary epidermis forms the extension of the expanding keel); persistent in shape, translucent, ± flat, and of ± equal diameter throughout. Closing bodies absent. Valve wings broad.

Titanopsis type

Expanding keels distinct from expanding sheets, divergent and broadened towards the centre of the valve. Covering membranes compound (as in the Drosanthemum type), but central parts thicker than marginal parts, and boundaries slightly raised into low ridges, and marginal parts bent into the empty locules, translucent and descending centrifugally; extension of very floppy, thin covering membranes reduced. Closing bodies absent or small. Valve wings broad.

Delosperma type

Expanding keels ± radial, distinct from expanding sheets. Covering membranes absent or vestigial, derived entirely from inner endocarpal valvar tissue declining into the empty locules. Closing bodies absent. Valve wings broad.

Lampranthus type

Expanding keels divergent, sometimes broadened. Covering membranes rigid, stout, of persistent convex shape, with a distinct recurved rim above and a closing ledge below their distal ends. Closing bodies absent but with bunches of sterile funicular hairs at exits of locules. Valve wings present or absent.

Ruschia type

Expanding keels widely divergent, short, without a radial extension, not higher than broad. Covering membranes stout, of persistent convex shape with distal upright rims and prominent closing rodlets below. Closing bodies small, rodlet-shaped, each with a small central corky part. Valve wings narrow or absent.

Leipoldtia type

Expanding keels divergent, with distinct radial awns, not broadened; expanding sheets present. Covering membranes persistent, resilient, of permanent concave shape with curved radial upper edges, distally and distinctly recurved; endocarp forming a ± pronounced boss or ledge below the expanding keel. Closing bodies large, distinctly stalked, outer layers sclerenchymatous, inner corky tissue well developed. Valve wings broad.

Keys to genera

Many genera of this family are difficult to key out. This is due partly to insufficient knowledge of the group and partly to the great variability of its members. Two keys to genera are presented here: Key 1, based on Bolus in Herre (1971), using mainly fruit and flower characters; and Key 2 (see p. 368) based on Hartmann (1991b), using mainly vegetative features. In Key 2 several genera will key out in more than one group.

Key 1 (based mainly on fruit and flower characters)

1a Placentation axile:
  2a Leaves flat:
    3a Fruit a schizocarp:
      4a Perennials; petals white; fruit consisting of 3 or 4 nut-like, bilocular mericarps which contain a single seed in each locule ..... **Caryotophora**
      4b Annuals; petals yellow; fruit consisting of 18–21 membranous, 1-seeded sections ..... **Hymenogyne**
    3b Fruit a capsule:
      5a Leaves persisting as membranous skeletons with margins and veins intact, sometimes until the next season's growth ..... **Sceletium**
      5b Leaves not as above:
        6a Stigmas red ..... **Mesembryanthemum**
        6b Stigmas green or pallid:
          7a Leaves opposite:
            8a Annuals; leaves conspicuously united ..... **Synaptophyllum**
            8b Perennials; leaves not conspicuously united ..... **Aptenia**
          7b Leaves alternate on flowering branches:
            9a Bladder cells conspicuous; leaves of the central tuft, if present, usually forming a rosette, margins undulate ..... **Mesembryanthemum**
            9b Bladder cells not, or scarcely, visible; leaves of the central tuft erect, margins flat ..... **Prenia**
  2b Leaves terete, subterete, or semiterete:
    10a Perennials:
      11a Internodes entirely enclosed in embracing leaf tissue, or with age becoming evident:
        12a Leaves semiterete, up to 35 mm long and 8 mm in diameter; sepals very unequal; corolla fugitive, up to 25 mm long; shrubby ..... **Aspazoma**

12b Leaves terete and finger-like, up to 70 mm long and 20 mm in diameter; sepals nearly equal; corolla long-lived, up to 15 mm long, petals stiff; forming clumps ..... **Dactylopsis**
11b Internodes not thus enclosed:
13a Branches usually constricted at the nodes; leaf bases sheathing, persistent; staminodes usually petaloid:
14a Leaf sheaths fringed with conspicuous, deflexed hairs at base (or in *B. marlothii* at the tip of the leaf sheaths) ..... **Brownanthus**
14b Leaf sheaths nude at the base, inconspicuous:
15a Plants with creeping annual stems and tuberous rootstocks ..... **Caulipsolon**
15b Plants with upright stems; roots not tuberous ..... **Psilocaulon**
13b Branches very rarely constricted at the nodes; leaf bases not conspicuously persistent; staminodes filamentous, usually absent in *Aridaria* and *Phyllobolus*:
16a Bladder cells scarcely visible; branches and peduncles woody or wiry; cymes distinctive, dichasial; flowers usually nocturnal ..... **Aridaria**
16b Bladder cells usually evident; young branches and peduncles externally herbaceous; flowers 1–3-nate; flowers usually diurnal ..... **Phyllobolus**
10b Annuals or biennials ..... **Mesembryanthemum**
1b Placentation parietal:
17a Fruit indehiscent, juicy and edible ..... **Carpobrotus**
17b Fruit capsular:
18a Locules of the capsule without covering membranes:
19a Nectary composed of 5 or 6 (in *Corpuscularia*) pits or hollows, sometimes surmounted by rudimentary glands:
20a Annuals; herbaceous parts papillose; leaves flat, entire or pinnatifid ..... **Cleretum**
20b Perennials, herbaceous parts not papillose; leaves thick, usually acutely keeled and dentate ..... **Stomatium**
19b Nectary not composed of pits or hollows:
21a Capsule dehiscing in dry conditions; valves without expanding keels, remaining ± erect (except in *Conicosia* species, previously in *Herrea*, where the capsule breaks up into separate segments):
22a Leaves flat; stigmas 5; capsule closing again if placed in water ..... **Saphesia**
22b Leaves triquetrous or terete or subterete; stigmas more than 10 ..... **Conicosia**
21b Capsule dehiscing in wet conditions; valves with expanding keels, widely spreading or recurved when fully expanded:
23a Nectary composed of separate glands, which in *Mossia* are so close as to form an almost annular nectary:
24a Petals united at the base; staminodes and stamens joined at the corolla tube ..... **Ruschianthus**
24b Petals not united at the base:
25a Leaves entirely united to form an ovoid or subglobose body, pubescent with deflexed hairs ..... **Muiria**
25b Leaves not as above:
26a Leaves fenestrate at the apex ..... **Frithia**
26b Leaves not fenestrate:
27a Capsule very small, with thin walls, sometimes breaking up into 5 parts, or whitish with 6 locules:
28a Leaves glistening, finely papillose, to hairy:
29a Plants minute, lower than 15 mm ..... **Ectotropis**
29b Plants small to medium-sized shrubs or herbs ..... **Delosperma**
28b Leaves rough or smooth in texture, greyish to silvery green:
30a Capsules with dark persistent petals on top, valves not closing again completely ..... **Corpuscularia**
30b Capsules without persistent petals, closing again after opening ..... **Hartmanthus**
27b Capsule not as above:
31a Compact plants with internodes enclosed:
32a Leaves usually rough (in *R. macradenium* smooth), not papillose ..... **Rhinephyllum**
32b Leaves very smooth; bracts present ..... **Carruanthus**
31b Plants ± loosely branched with internodes visible:
33a Plants creeping; leaves with feint dark spots ..... **Mossia**
33b Plants occasionally creeping; leaves often with visible water storage cells ..... **Delosperma**
23b Nectary annular:
34a Petals stiff and rather thick, staying fresh longer than is known in any other genus except *Dactylopsis* ..... **Nelia**
34b Petals not as above, ± fugitive:
35a Sepals and petals united to form a calyx tube and corolla tube ..... **Conophytum**
35b Sepals and petals free at base:
36a Leaves expanded and flat:
37a Flowers opening in the afternoon; petals yellow; plants annual, sun-loving ..... **Apatesia**
37b Flowers opening in the morning; petals white; plants not annual, shade-loving ..... **Skiatophytum**
36b Leaves not expanded and flat:
38a Plants resembling clusters of grapes on account of the rounded, grape-like or club-shaped leaves… ..... **Jensenobotrya**
38b Plants not as above:
39a Peduncle with bracts:
40a Herbaceous parts with sand adhering to the viscid epidermis ..... **Psammophora**
40b Herbaceous parts not as above:

41a Leaves acutely keeled upwards; sepals 6 ..... **Conophytum**
41b Leaves not acutely keeled; sepals 5:
42a Shrubby; petals whitish; staminodes present ..... **Zeuktophyllum**
42b Dwarf, compact plants; petals yellow, with or without a central, red stripe; staminodes absent ..... **Nananthus**
39b Peduncle bractless:
43a Compact plants with internodes enclosed in the leaf sheaths:
44a Sepals 4 ..... **Juttadinteria**
44b Sepals 5–10:
45a Stigmas 9–25 ..... **Namibia**
45b Stigmas 4–10:
46a Leaf pairs forming bodies:
47a Petals in the lower half white, in the upper half purplish ..... **Oophytum**
47b Petals yellow or white:
48a Apex of leaves ± flattened; sepals 4–7 ..... **Lithops**
48b Apex of leaves not flattened, if flattened (as in *D. pole-evansii* and *D. vanzijlii*) sepals 8–10 ..... **Dinteranthus**
46b Leaf pairs not forming bodies ..... **Schwantesia**
43b Plants with elongated branches; some of the internodes visible:
49a Creeping; leaf pairs of one form; flowers nocturnal ..... **Neohenricia**
49b Erect; leaf pairs of two, or at flowering time of three different forms; flowers diurnal ..... **Mitrophyllum**

18b Locules of the capsule with covering membranes, which are sometimes incomplete:
50a Locules without closing bodies (closing bodies occasionally present in *Drosanthemum* and *Trichodiadema*):
51a Annuals:
52a Leaves pinnatifid ..... **Aethephyllum**
52b Leaves entire:
53a Stigmas 5, hardening and accrescent with age and persisting throughout the fruiting stage ..... **Dorotheanthus**
53b Stigmas 12–20, withering with the rest of the flower before the fruit matures ..... **Carpanthea**
51b Perennials:
54a Leaf pairs of two or of three different forms, or as persistent membranous sheaths protecting the subsequent developing leaf pair:
55a Internodes invisible; lower pair of leaves not always evident:
56a Upper leaf pair spreading or prostrate on the ground, much more united on one side than on the other; flowers sessile ..... **Diplosoma**
56b Upper leaf pair erect or suberect or ascending, symmetrically united below; flowers usually moniliform; staminodes absent ..... **Monilaria**
55b Some internodes visible; lower pair of leaves always evident:
57a Plants creeping, rooting at nodes; leaves toothed ..... **Hammeria**
57b Plants not rooting at nodes; leaves not toothed:
58a Leaf pairs trimorphic at flowering time ..... **Mitrophyllum**
58b Leaf pairs dimorphic throughout:
59a Sepals 4; staminodes present ..... **Dicrocaulon**
59b Sepals 5 or 6; staminodes absent:
60a Lower leaf pairs oviform in earlier stages; petals rather lax, rose or rose-purple ..... **Meyerophytum**
60b Lower leaf pairs bead-like; petals dense, white, or white and rose in the same species ..... **Monilaria**
54b Leaf pairs of one form (or in *Drosanthemum diversifolium* dimorphic):
61a Nectary composed of separate glands, which rarely may be contiguous and form an almost annular nectary:
62a Sepals and petals connate below; style present ..... **Gibbaeum**
62b Sepals and petals not connate; style absent:
63a Herbaceous parts papillose:
64a Leaves usually crowned with spreading or erect bristles, or their vestiges ..... **Trichodiadema**
64b Leaves without terminal bristles (tubercle in locules of capsule very rarely present) ..... **Drosanthemum**
63b Herbaceous parts not papillose:
65a Plants creeping:
66a Petals yellow ..... **Chasmatophyllum**
66b Petals white ..... **Mossia**
65b Plants not creeping:
67a Flowers cymose ..... **Oscularia**
67b Flowers solitary:
68a Leaves dentate, teeth ending in a bristle ..... **Faucaria**
68b Leaves entire:
69a Peduncle bracteate:
70a Petals yellow ..... **Rabiea**

70b Petals purple-rose ..... **Cerochlamys**
69b Peduncle bractless ..... **Gibbaeum**
61b Nectary annular or indistinct:
71a Petals yellow (red-orange in *Titanopsis hugo-schlechteri*):
72a Stigmas 10 ..... **Vanheerdea**
72b Stigmas 5–7:
73a Compact plants with internodes enclosed in the leaf sheaths:
74a Glabrous; leaves warted or pustulate in the upper part; sepals and stigmas 6 ..... **Titanopsis**
74b Receptacle and sepals pubescent; leaves without warts or pustules (microscopically granulated); sepals 7; stigmas 6 or 7 ..... **Lapidaria**
73b Erect, decumbent or creeping plants with internodes visible:
75a Leaf keel serrate ..... **Circandra**
75b Leaf keel entire:
76a Valves of the expanded capsule winged ..... **Lampranthus**
76b Valves of the expanded capsule not winged ..... **Scopelogena**
71b Petals rose-purple, pink, red, pallid or white:
77a Stigmas 8–14:
78a Stigmas minute, completely hidden by staminodes and stamens:
79a Leaf keels entire ..... **Smicrostigma**
79b Leaf keels lacerate ..... **Erepsia**
78b Stigmas not as above:
80a Peduncle bracteate:
81a Low, compact plants; sepals 5 ..... **Dracophilus**
81b Shrubby plants, 150–300 mm high; sepals 4:
82a Herbaceous parts smooth; stamens not papillose; seeds echinate ..... **Namaquanthus**
82b Herbaceous parts appearing as if dusted with grey powder; stamens papillose; seeds smooth ..... **Wooleya**
80b Peduncle bractless:
83a Staminodes present; valves of the expanded capsule not winged ..... **Khadia**
83b Staminodes absent, valves of the expanded capsule winged ..... **Jacobsenia** (=*Drosanthemopsis*)
77b Stigmas 5 or 6:
84a Herbaceous parts ± papillose:
85a Sepals and stigmas 5 ..... **Jacobsenia**
85b Sepals and stigmas 6 ..... **Drosanthemum**
84b Herbaceous parts not papillose:
86a Flowers terminating the previous year's growth, otherwise developing axillary shoots ..... **Didymaotus**
86b Flowers not as above:
87a Flowers in conspicuously branched, pedunculate cymes; rootstock remarkably large and sometimes tuberous ..... **Mestoklema**
87b Flowers and rootstock not as above:
88a Herbaceous parts smooth:
89a Seeds echinate ..... **Braunsia**
89b Seeds not as above:
90a Valves of the expanded capsule winged ..... **Lampranthus**
90b Valves of the expanded capsule not winged:
91a Fruit 5–7-locular; flowers with 6 sepals; petals sparse, pink ..... **Vlokia**
91b Fruit (4)5–11-locular; flowers with 5 or 6 sepals; petals more abundant, white, pink or magenta ..... **Khadia**
88b Herbaceous parts hairy ..... **Braunsia**
50b Locules of the capsule with closing bodies (sometimes obscure or absent in *Aloinopsis* and *Antimima*, very small in *Antegibbaeum* and uncertain in *Calamophyllum*):
92a Stigmas 5 or 6:
93a Petals purple-red, pink or white:
94a Nectary composed of separate glands ..... **Cerochlamys**
94b Nectary annular:
95a Placental tubercle 2-lobed ..... **Disphyma**
95b Placental tubercle not 2-lobed:
96a Peduncle not spinescent:
97a Herbaceous parts with sand adhering to the viscid epidermis ..... **Arenifera**
97b Herbaceous parts not as above:
98a Capsule in the lower part isolated into mericarps ..... **Ruschianthemum**
98b Capsule not as above:
99a Valves of the expanded capsule winged:
100a Shrubby; internodes visible; cymes often conspicuously branched:
101a Capsule not closing again after first opening ..... **Stoeberia**

101b Capsule not as above ..... **Amphibolia**
100b Dwarf, compact plants; internodes enclosed; flowers solitary or 1–3-nate:
102a Leaves cylindrical or subcylindrical; flowers solitary:
103a Bracts large, sometimes exceeding the flowers; sepals 5 ..... **Cylindrophyllum**
103b Bracts very small; sepals 6 ..... **Antegibbaeum**
102b Leaves laterally compressed in the upper part; flowers finally 2- or 3-nate ..... **Ebracteola**
99b Valves of the expanded capsule wingless:
104a Seeds echinate or rough ..... **Astridia**
104b Seeds not as above:
105a Leaves toothed to a greater or lesser extent, or with one or two mucros at the apex:
106a Closing bodies white; pollen white ..... **Acrodon**
106b Closing bodies brownish or colourless; pollen yellow ..... **Ruschia**
105b Leaves not toothed, with or without mucros at apex:
107a Roots tuberous ..... **Marlothistella**
107b Roots not as above ..... **Antimima**
96b Some or all of the peduncles spinescent:
108a Valves bend backwards more than 180 degrees when capsule is wet; valve wings broad and rectangular ..... **Eberlanzia**
108b Valves do not reach horizontal position when fruit is wet; valve wings rudimentary..... **Ruschia** subgenus **Spinosa**
93b Petals yellow, golden or orange-red:
109a Leaf pairs of two different forms at flowering time; nectary annular ..... **Mitrophyllum**
109b Leaf pairs of one form; nectary composed of separate glands:
110a Wings of the locules of the expanded capsules erect ..... **Orthopterum**
110b Wings not erect:
111a Leaves short and thick, polymorphic; valves erect in expanded capsule ..... **Bijlia**
111b Leaves not as above; valves widely spreading or recurved:
112a Leaves usually triquetrous:
113a Filaments papillate; stigmas 5; keels of valves in expanded capsule diverging from the base; closing bodies large ..... **Bergeranthus**
113b Filaments epapillate; stigmas 5 or 6; keels parallel below; closing bodies small.... **Machairophyllum**
112b Leaves not triquetrous, one of a pair often slightly differing in form from the other:
114a Closing bodies with a dividing line in the middle ..... **Rhombophyllum**
114b Closing bodies not as above ..... **Hereroa**
92b Stigmas more than 6 (or 6 in some species of *Khadia*):
115a Leaves fenestrate at the apex ..... **Fenestraria**
115b Leaves not as above:
116a Petals filiform-linear, white, often in 5 groups ..... **Polymita**
116b Petals not as above:
117a Plants dwarf, compact:
118a Peduncle bractless:
119a Petals pink or rose-purple; staminodes present ..... **Khadia**
119b Petals yellow or rarely white; staminodes absent ..... **Glottiphyllum**
118b Peduncle with bracts:
120a Leaf pairs of two different forms ..... **Cheiridopsis**
120b Leaf pairs of one form:
121a Receptacle produced above the ovary into a tube; stamens deflexed; stigmas obscurely defined, forming a viscid, circular pulvinus ..... **Argyroderma**
121b Receptacle, stamens and stigmas not as above:
122a Herbaceous parts glabrous:
123a Rootstock (where known) tuberous:
124a Leaves velvety, appearing dust-covered, long-triangular ..... **Deilanthe**
124b Leaves rough-textured, spoon-shaped ..... **Aloinopsis**
123b Rootstock not tuberous:
125a Nectary usually composed of separate glands ..... **Machairophyllum**
125b Nectary annular (unknown in *Calamophyllum*):
126a Petals pallid, rose, rose-purple or deep red:
127a Flowers solitary:
128a Sepals 5 ..... **Cylindrophyllum**
128b Sepals 4 ..... **Calamophyllum**
127b Flowers not solitary ..... **Cephalophyllum**
126b Petals yellow, golden or orange-red:
129a Fruit 10-locular, convex on top, with tiny closing bodies ..... **Tanquana**
129b Fruit 9–15-locular, with large white to brown closing bodies ..... **Pleiospilos**
122b Herbaceous parts pilose or pubescent:

130a Leaves obtusely keeled, dentate or denticulate ..... **Odontophorus**
130b Leaves entire or rarely with the keels only dentate, in which case they are acutely keeled upwards ..... **Cheiridopsis**
117b Plants with ± elongated branches with at least some of the internodes visible, except in young plants of the shrubby *Ottosonderia*:
131a Inflorescence persisting for several years and eventually becoming an obconic cyme, the axils of the previous year's highly succulent hypsophylls (bract-like leaves within the inflorescence) normally producing one to several flowers which represent the annual growth ..... **Ottosonderia**
131b Inflorescence not as above:
132a Leaf pairs of two different forms ..... **Vanzijlia**
132b Leaf pairs of one form:
133a Peduncle with bracts:
134a Sepals 4:
135a Leaves entire, 40–60 mm long:
136a Filaments papillose; stigmas 8; seeds smooth ..... **Enarganthe**
136b Filaments not papillose; stigmas 8–12; seeds echinate ..... **Namaquanthus**
135b Leaves denticulate, shorter than 20 mm ..... **Octopoma**
134b Sepals 5 or 6:
137a Sepals 5:
138a Leaves shorter than 20 mm: flowers sessile or subsessile ..... **Octopoma**
138b Leaves longer than 20 mm; flowers pedunculate:
139a Herbaceous parts pubescent:
140a Leaves dentate ..... **Odontophorus**
140b Leaves entire ..... **Cheiridopsis**
139b Herbaceous parts glabrous:
141a Leaves rough, sometimes dentate ..... **Cheiridopsis**
141b Leaves not as above:
142a Usually decumbent and often creeping; stigmas 10 or more:
143a Leaves tapering at both ends; fruit squarish-looking on top with valves bent at a ± 90 degree angle ..... **Jordaaniella**
143b Leaves spindle-, quill- or club-shaped; capsules not as above ..... **Cephalophyllum**
142b Usually erect or, if decumbent, not creeping; stigmas 10 or fewer:
144a Leaves obtusely keeled; valve wings present:
145a Plants upright ..... **Leipoldtia**
145b Plants creeping ..... **Hallianthus**
144b Leaves acutely keeled; valve wings absent ..... **Stayneria**
137b Sepals 6 ..... **Schlechteranthus**
133b Peduncle bractless:
146a Leaves of a pair dissimilar and unequal in length, the large more than 50 mm long, sometimes with a marginal tooth or hump, or with a conspicuous white margin ..... **Glottiphyllum**
146b Leaves of a pair similar and about equal in length, shorter than 50 mm, entire and without a white margin ..... **Malephora**

Key 2 (based mainly on vegetative characters)

1a Ovary always with an axile placenta; nectary koilomorphic: represented usually by 4 or 5 shell-shaped depressions; fruits with expanding keels, if present, reaching from central axis to tips of valves; fruit rarely a woody nut: MESEMBRYANTHEMOIDEAE:
2a Leaves flat:
3a Leaves becoming skeleton-like with lignified veins and margins, persistent and enclosing young buds ..... **Sceletium**
3b Leaves not drying skeleton-like:
4a Leaves stem-clasping, opposite, shape and particularly size of basal and upper leaves markedly different ..... **Synaptophyllum**
4b Leaves not stem-clasping, opposite, occasionally becoming alternate in the inflorescence, or throughout the plant, occasionally appearing petiolate, with no marked difference in size between basal and upper leaves:
5a Leaves with conspicuous bladder cells, leaf margins often undulate ..... **Mesembryanthemum**
5b Leaves with inconspicuous bladder cells, leaf margins flat:
6a Leaves shortly fused at the base, glaucous, covered with a thick wax layer that rubs off easily; the green parts of the stem become dry and remain on the slightly woody stem as a thick whitish layer ..... **Prenia**
6b Leaves not fused at the base, shiny green, without visible wax layer; stems green and succulent, 4-angled or cylindrical ..... **Aptenia**
2b Leaves ± cylindrical:
7a Internodes entirely enclosed in embracing leaf tissue:
8a Leaves alternate, finger-like, up to 100 mm long and up to 20 mm in diameter; plants compact, dwarf ..... **Dactylopsis**
8b Leaves opposite, subterete, basally free, up to 35 mm long and up to 8 mm in diameter; shrublets up to 150 mm high ..... **Aspazoma**
7b Internodes not entirely enclosed by leaf tissue but often with green, succulent cortex:

9a Stems constricted at nodes, green, with persistent, succulent primary cortex:
10a Bladder cells at base and edges of leaves often becoming hair-like, bladder cells on stems densely arranged and firm to the touch, those on the leaves more sparse and soft to the touch ..... **Brownanthus**
10b Bladder cells on leaves and stems similar to ± absent, rarely becoming hair-like:
11a Perennials with creeping annual stems and tuberous rootstock ..... **Caulipsolon**
11b Perennials or annuals with erect to decumbent stems; roots not tuberous ..... **Psilocaulon**
9b Plants with a continuous stem, only the young stages green, primary cortex not persistent:
12a Bladder cells scarcely visible; branches and peduncles woody or wiry ..... **Aridaria**
12b Bladder cells usually conspicuous; young branches and peduncles externally herbaceous:
13a Shrublets or subshrubs, often with thickened roots; stems corky or lignified, at least towards the base . **Phyllobolus**
13b Annual to perennial fleshy herbs with fibrous roots; stems herbaceous ..... **Mesembryanthemum**

1b Ovary with placenta parietal to basal, very rarely axile (*Caryotophora*, *Hymenogyne*, both with schizocarpic fruit); nectaries lophomorphic: crest-shaped, either as separate glands or united into a ring, rarely ± absent; fruit with expanding keels never reaching the centre of the fruit; fruit, if not opening when wetted, then rarely opening when drying out, fleshy or breaking up into mericarps: RUSCHIOIDEAE:

Key to groups of Ruschioideae

1a Leaves with a sticky surface, sand and soil adhering to it ..... **Group A**
1b Leaves with a smooth or papillate surface, often glistening, but not sticky:
2a Plants heterophyllous: different types of leaf pairs present: ..... **Group B**
2b Plants homophyllous: all leaves ± similar:
3a Leaves flat, wider than thick, petiolate ..... **Group C** (p. 370)
3b Leaves three-dimensional, triquetrous, trigonous, terete, not wider than thick:
4a Plants creeping, with procumbent stems ..... **Group D** (p. 370)
4b Plants compact, caespitose or shrubby:
5a Plants compact and tufted, all internodes completely concealed by the leaves ..... **Group E** (p. 371)
5b Plants caespitose, shrubby, or if basally compact then with additional long shoots:
6a Plants caespitose, internodes short but visible, procumbent, stems not rooting ..... **Group F** (p. 373)
6b Plants shrubby, long shoots ascending, erect, or climbing, sometimes with a compact centre:
7a Shrubs or shrublets without spines ..... **Group G** (p. 374)
7b Shrubs or shrublets with spines ..... **Group H** (p. 376)

Group A. Plants with sticky surfaces

Capsules with covering membranes, locules 8; epidermis cells of leaves undivided ..... **Arenifera**
Capsules without covering membranes or with narrow rims, locules 5; epidermis cells of leaves divided by secondary walls... ..... **Psammophora**

Group B. Heterophyllous plants (different types of leaf pairs are present)

1a Leaf surface with bladder cells:
2a Plants compact, tufted:
3a Capsules with parallel expanding keels ..... **Oophytum**
3b Capsules with divergent expanding keels:
4a Plants small, lower than 40 mm ..... **Diplosoma**
4b Plants larger, 40–150 mm high ..... **Monilaria**
2b Plants shrubby:
5a Old leaf sheaths with sclerotic bases, enclosing the internodes completely ..... **Monilaria**
5b Old leaf sheaths papery or parchment-like, entire:
6a Leaves dentate ..... **Hammeria**
6b Leaves not dentate:
7a More than 2 leaf pairs produced per season ..... **Dicrocaulon**
7b Two leaf pairs produced per season:
8a Flowers basally enclosed by a cup ..... **Dicrocaulon**
8b Flowers exserted above the leaves, without a basal cup:
9a Both leaf pairs connate for more than 50% of their length ..... **Meyerophytum**
9b One leaf pair connate for less than 25% of its length, spreading; the other connate for more than 50% of its length, erect ..... **Mitrophyllum**
1b Leaf surface without bladder cells, homocellular:
10a Capsules 5-locular ..... **Antimima**
10b Capsules multilocular:
11a Plants with long, erect or straggling branches from a compact (tufted) base ..... **Vanzijlia**
11b Plants compact to caespitose ..... **Cheiridopsis** subgenus **Cheiridopsis**

Group C. Plants with ± flat leaves (leaves wider than thick)

1a Plants perennial:
2a Leaves soft and smooth, surface mesomorphic:
3a Fruit woody, finally disintegrating into nutlets ..... **Caryotophora**
3b Fruit a capsule:
4a Capsule xerochastic:
5a Leaves homocellular, without bladder cells; capsules with separate marginal seed-pockets at half their height….. ..... **Skiatophytum**
5b Leaves with bladder cells; capsule without pockets ..... **Saphesia**
4b Capsule hygrochastic with well-developed expanding keels and sheets:
6a Plants anisophyllous, i.e. the leaves of a pair are unequal in size; capsules multilocular, with firm, undulating covering membranes, with or without reduced valve wings ..... **Glottiphyllum**
6b Plants isophyllous, i.e. the leaves of a pair are equal in size; capsules 5-locular, without covering membranes, but with broad, triangular valve wings ..... **Delosperma**
2b Leaves hard, with warts or white dots, or velvety and dust-covered, leaf surface xeromorphic:
7a Leaves with fine white, often raised dots, leaf tips tapering ..... **Nananthus**
7b Leaves with warts, particularly along the distal broadened margin, leaf tips broadly rounded:
8a Fruit 5-locular ..... **Titanopsis**
8b Fruit multilocular:
9a Leaves velvety, dust-covered ..... **Deilanthe**
9b Leaves tuberculate or punctate ..... **Aloinopsis**
1b Plants annual:
10a Leaf surface ± smooth:
11a Leaf margin ciliate; capsules with locules covered by the overarching covering membranes ..... **Carpanthea**
11b Leaf margin with bladder cells, never ciliate; capsules with seed pockets:
12a Leaf epidermis with tanniniferous idioblasts; fruit breaking into mericarps enclosing one seed each..... **Hymenogyne**
12b Leaf epidermis without tanniniferous idioblasts; fruit opening hygroscopically by expanding keels ..... **Apatesia**
10b Leaf surface with prominent bladder cells:
13a Leaves lyrate:
14a Top of capsule flat; valves with expanding sheets only ..... **Aethephyllum**
14b Top of capsule with ribs; valves with expanding keels merging into expanding sheets ..... **Cleretum**
13b Leaves entire:
15a Valve wings broad, rectangular ..... **Cleretum**
15b Valve wings tapering into awns ..... **Dorotheanthus**

Group D. Plants with creeping growth form

(Plants procumbent, rooting at the nodes, only short branches, usually with tufted leaves, growing erect.)
Note: Not included are genera such as *Rhinephyllum* and *Cylindrophyllum* which may comprise creeping forms.

1a Internodes on the main stems long, woody or spongy; adventitious roots fibrous:
2a Internodes with prominent hairs (elongated bladder cells) ..... **Drosanthemum**
2b Internodes with papillate or smooth surface:
3a Fruit a berry ..... **Carpobrotus**
3b Fruit a hygrochastic capsule:
4a Leaf surface mesomorphic; leaves soft:
5a Capsule multilocular ..... **Malephora**
5b Capsule 5- or 6-locular:
6a Capsule with parallel expanding keels:
7a Plants minute, 15 mm high, 30 mm wide ..... **Ectotropis**
7b Plants not minute, taller than 15 mm ..... **Delosperma**
6b Capsule with diverging expanding keels:
8a Closing bodies large, bipartite ..... **Disphyma**
8b Closing bodies absent; locule closed by funicles ..... **Lampranthus**
4b Leaf surface xeromorphic; leaves firm:
9a Leaves with teeth along margins and keel ..... **Chasmatophyllum**
9b Leaves without teeth at margins or keel (but mucronate):
10a Capsules multilocular:
11a Capsules with small closing bodies ..... **Jordaaniella**
11b Capsules with large closing bodies:
12a Stems strictly procumbent, each node with adventitious roots ..... **Cephalophyllum**
12b Some stems spreading, later curving down and rooting near their tips (saltatory) ..... **Leipoldtia**
10b Capsules usually 5- or 6-locular:
13a Leaves small, <15 mm long ..... **Mossia**
13b Leaves larger, >20 mm long:

14a Fruit without closing bodies ..... **Vlokia**
14b Fruit with closing bodies ..... **Ruschia**
1b Internodes on the main stem short; adventitious roots thickened and fleshy:
15a Leaves ± sharply triquetrous:
16a Capsules with >10 locules ..... **Cephalophyllum**
16b Capsules with <10 locules:
17a Leaf margins serrate ..... **Acrodon**
17b Leaf margins entire:
18a Flowers yellow ..... **Bergeranthus**
18b Flowers purple or white ..... **Khadia**
15b Leaves ± club-shaped, terete but widening distally:
19a Widened tip of leaf warty, rough ..... **Neohenricia**
19b Widened tip of leaf with a window:
20a Capsules multilocular ..... **Fenestraria**
20b Capsules 5- or 6-locular ..... **Frithia**

Group E. Plants with a compact growth form ('Flowering stones')

(Internodes of these plants are very short and not visible because they are enclosed by the sheathing leaf bases.)

1a Plants heterophyllous, i.e. with two different leaf pairs per season:
2a Leaves xeromorphic ..... **Cheiridopsis**
2b Leaves mesomorphic:
3a Fruit with parallel expanding sheets ..... **Oophytum**
3b Fruit with expanding keels widely diverging and merging gradually into expanding sheets:
4a Plants lower than 40 mm ..... **Diplosoma**
4b Plants higher than 50 mm ..... **Monilaria**
1b Plants isophyllous or anisophyllous, but not heterophyllous:
5a Leaves of a pair highly connate (>50%):
6a Plants sunken into the ground or in crevices:
7a Capsules >10-locular:
8a Leaf surface smooth, almost white, hard ..... **Argyroderma**
8b Leaf surface with distant papillae, bright green ..... **Vanheerdea**
7b Capsules 5–8-locular:
9a Fruit with basal bracteoles ..... **Conophytum**
9b Fruit without basal bracteoles:
10a Predominant number of locules per fruit in a population 5 or 6 ..... **Lithops**
10b Predominant number of locules per fruit 7 or more:
11a Seeds tuberculate, tubercles distant ..... **Dinteranthus**
11b Seeds smooth to rugose ..... **Lithops**
6b Plants above ground, clumpy:
12a Capsules without covering membranes:
13a Leaves firm, xeromorphic ..... **Conophytum**
13b Leaves soft, mesomorphic:
14a Leaves with fine, velvety hairs ..... **Muiria**
14b Leaf surface smooth, sometimes papillate ..... **Conophytum**
12b Capsules with covering membranes:
15a Leaf surface smooth, glaucous-grey ..... **Argyroderma**
15b Leaf surface with papillae:
16a Capsules 5–8-locular ..... **Gibbaeum**
16b Capsules >10-locular:
17a Capsules with large closing bodies; leaves with prominent teeth along edges ..... **Odontophorus**
17b Capsules without closing bodies ..... **Vanheerdea**
5b Leaves of a pair less connate (<30%):
18a Plants with a persistent primary stem forming a head with closely arranged foliage leaves (similar to a rosette, but not flat); inflorescences developed laterally and mainly basally:
19a Leaves xeromorphic; capsules with broad, rectangular valve wings ..... **Cephalophyllum**
19b Leaves mesomorphic; capsules without valve wings or with narrow ones ..... **Conicosia**
18b Plants without a distinct persistent primary stem and without a head as described above:
20a Leaf surface mesomorphic; with bladder cells or smooth:
21a Leaves anisophyllous, tongue-shaped ..... **Glottiphyllum**
21b Leaves isophyllous, ± terete or flattish:
22a Leaf tips with a diadem (a group of spreading bristles with a corky base) ..... **Trichodiadema**
22b Leaf tips without a diadem ..... **Delosperma**

20b Leaves xeromorphic, without bladder cells, firm, smooth to papillate:
23a Leaves with a sticky surface, sand adhering to it ..... **Psammophora**
23b Leaves not sticky:
24a Leaves triquetrous-acuminate, i.e. tapering from the base into a pointed tip, leaves slender; developing a fleshy stem with age (corm):
25a Plants growing sunken into the ground on loamy or silty flats; leaf tips emerging ..... **Nananthus**
25b Plants with the leaves completely above ground, in rocky, stony or shaly ground:
26a At least some leaves with teeth or a serrate keel; flowers with central red stripes along petals; fruit with a rounded base ..... **Acrodon**
26b Leaves without teeth, not serrate:
27a Flowers and fruit on stalked dichasia projecting beyond the leaves ..... **Bergeranthus**
27b Flowers ± solitary, not carried above the leaves:
28a Capsule with tiny closing bodies; plants with a thickened rootstock:
29a Capsule with a flat or centrally raised top and a funnel-shaped base ..... **Ebracteola**
29b Capsule with a rounded top and base ..... **Rabiea**
28b Capsule with large closing bodies; plants developing corms with age:
30a Petals striped ..... **Marlothistella**
30b Petals not striped ..... **Khadia**
24b Leaves trigonous, hunched (± gibbose), semiglobose-terete, tongue-shaped, or club-shaped but never triquetrous-acuminate as above:
31a Leaves of a pair anisophyllous:
32a Leaves keeled, triangular in cross section:
33a Keel sharply pleated, serrate ..... **Cephalophyllum**
33b Keel rounded:
34a Leaves ± symmetrical and as broad as thick; capsule without closing bodies ..... **Cerochlamys**
34b Leaves asymmetrical or thicker than broad; capsule with closing bodies ..... **Bijlia**
32b Leaves without a keel (oval to round in cross section):
35a Leaf surface velvety from papillae ..... **Gibbaeum**
35b Leaf surface smooth:
36a Leaves slender, > 3× longer than wide; capsule dark brown with a rounded top ..... **Antegibbaeum**
36b Leaves short, < 3× longer than wide; capsule greyish with a flat top ..... **Tanquana**
31b Leaves of a pair isophyllous:
37a Plants sunken into the ground:
38a Several subsequent pairs of foliage leaves on a shoot forming a rosette:
39a Leaves small, < 8 mm wide:
40a Leaves with an apical window ..... **Frithia**
40b Leaves with tiny warts, spirally arranged towards tip ..... **Neohenricia**
39b Leaves larger, > 10 mm wide:
41a Capsule > 10-locular ..... **Aloinopsis**
41b Capsule 5–7-locular ..... **Titanopsis**
38b One pair of foliage leaves per shoot (two only during active growth or in cultivation):
42a Capsule 5–8-locular ..... **Lithops**
42b Capsules >10-locular:
43a Leaves club-shaped with an apical window ..... **Fenestraria**
43b Leaves semiglobose to semi-oval, with a thick whitish surface ..... **Argyroderma**
37b Plants in clumps above the ground:
44a Leaves with well-developed papillae, i.e. velvety to the touch:
45a Leaves with teeth:
46a Capsules 5-locular ..... **Schwantesia**
46b Capsules multilocular:
47a Capsules with tiny closing bodies ..... **Ihlenfeldtia**
47b Capsules with large closing bodies:
48a Capsule with a flat top and funnel-shaped base ..... **Cheiridopsis**
48b Capsules with a rounded top and semiglobose base ..... **Odontophorus**
45b Leaves without teeth:
49a Capsules without covering membranes:
50a Leaves very thick, semi-ovate, as broad as thick; capsule multilocular ..... **Namibia**
50b Leaves triquetrous, keel prominent; capsule 5-locular ..... **Schwantesia**
49b Capsules with covering membranes:
51a Capsules <10-locular:
52a Covering membranes distally reflected, firm, resilient ..... **Antimima**
52b Covering membranes straight or distally inflexed, thin, flexible ..... **Gibbaeum**
51b Capsules >10-locular:
53a Capsules with narrow valve wings ..... **Cheiridopsis**
53b Capsules with broad valve wings, at least at their base:

54a Valve wings rectangular ..... **Cephalophyllum**
54b Valve wings tapering into awns, pointed ..... **Aloinopsis**
44b Leaves without papillae, epidermal cells sometimes elevated but never velvety to the touch:
55a Leaves without a distinct keel, although sometimes hunched (± gibbose), therefore oval to round in cross section:
56a Capsules 5–8-locular ..... **Cylindrophyllum**
56b Capsules with > 10 locules:
57a Leaves semiglobose, less than twice as long as broad ..... **Pleiospilos**
57b Leaves elongate, at least as long as broad ..... **Cephalophyllum**
55b Leaves keeled, therefore triangular in cross section:
58a Capsule multilocular (>10):
59a Capsules without closing bodies ..... **Dracophilus**
59b Capsules with closing bodies:
60a Closing bodies small ..... **Machairophyllum**
60b Closing bodies large:
61a Leaves whitish ..... **Argyroderma**
61b Leaves dark green:
62a Capsules dark brown, ± round ..... **Pleiospilos**
62b Capsules greyish brown, with an almost flat top ..... **Cheiridopsis**
58b Capsules 5–8-locular:
63a Capsules with covering membranes:
64a Leaves fat and short; flowers and fruits solitary:
65a Flowers developed seemingly laterally; one leaf pair per branch ..... **Didymaotus**
65b Flowers clearly terminal; 2 or 3 leaf pairs per branch ..... **Lapidaria**
64b Leaves more than three times longer than broad; flowers and fruits in dichasia:
66a Flowers white ..... **Nelia**
66b Flowers yellow:
67a Leaves with an extensive, often emarginate hunch superseding the tip of the upper side of the leaf ..... **Rhombophyllum**
67b Leaves only moderately hunched (gibbose) ..... **Hereroa**
63b Capsules without covering membranes, sometimes with a rim:
68a Valve wings absent or narrow:
69a Valve wings absent; flowers white or pink ..... **Ruschianthus**
69b Valve wings narrow; flowers yellow ..... **Carruanthus**
68b Valve wings broader than expanding keels, rectangular:
70a Valve wings stiff and woody, stretching over the locules ..... **Faucaria**
70b Valve wings flexible:
71a Flowers (and fruits) with bracteoles:
72a Leaves rounded-trigonous, sides concave, rarely straight; flowers with hypanthium.. ..... **Stomatium**
72b Leaves sharply triangular, sides straight to concave; flowers without a hypanthium:
73a Margins of leaves with teeth (sometimes few); leaves bright green ..... **Orthopterum**
73b Margins of leaves entire; leaves whitish ..... **Conophytum**
71b Flowers and fruits without bracteoles:
74a Leaves with a prominent, hard, spiny tip ..... **Schwantesia**
74b Leaves with a rounded though mucronate tip ..... **Dinteranthus**

Group F. Plants with caespitose growth form

(Internodes are short, the main shoots prostrate; adventitious roots are absent or only rarely formed.)

1a Leaves mesomorphic, with or without bladder cells:
2a Leaves of a pair anisophyllous ..... **Glottiphyllum**
2b Leaves of a pair isophyllous:
3a Internodes smooth ..... **Delosperma**
3b Internodes with hairs derived from elongated bladder cells ..... **Drosanthemum**
1b Leaves xeromorphic, firm, smooth to papillate, velvety:
4a Leaves with apical windows:
5a Capsules 5-locular ..... **Frithia**
5b Capsules multilocular ..... **Fenestraria**
4b Leaves without apical windows:
6a Plants anisophyllous:
7a Leaf surface velvety or minutely papillate ..... **Gibbaeum**
7b Leaf surface smooth:
8a Capsules with >10 locules ..... **Cephalophyllum**

8b Capsules with <10 locules ..... **Antegibbaeum**
6b Plants isophyllous:
9a Leaves of a pair united into a fleshy body (corpuscule) ..... **Conophytum**
9b Leaves of a pair free for most of their length:
10a Leaves finger-shaped to terete, not keeled:
11a Leaves small, < 6 mm in diameter, with spirally arranged warts ..... **Neohenricia**
11b Leaves larger, > 8 mm in diameter, without warts:
12a Leaves greyish green; capsules with a flat top; flowers with a hypanthium, number of elements < 300..... **Argyroderma**
12b Leaves dark green; capsules with high valve rims, top therefore elevated; flowers without a hypanthium, number of elements > 2 000 ..... **Cylindrophyllum**
10b Leaves trigonous to triquetrous, keeled:
13a Leaf surface velvety-papillate:
14a Closing bodies small ..... **Ihlenfeldtia**
14b Closing bodies large:
15a Valve wings rectangular, if pointed, plants heterophyllous ..... **Cheiridopsis**
15b Valve wings tapering into awns ..... **Odontophorus**
13b Leaf surface smooth or rough, but not papillate:
16a Leaves trigonous:
17a Covering membranes absent or narrow rims:
18a Leaves with teeth along margins, rarely only horny ..... **Stomatium**
18b Leaves without teeth, surface rough from hard white tubercles, or smooth ..... **Rhinephyllum**
17b Covering membranes complete:
19a Closing bodies small, hook-shaped ..... **Ruschia**
19b Closing bodies large or bipartite:
20a Covering membranes undulate with dorsal appendages ..... **Antimima**
20b Covering membranes straight, ± flat:
21a Leaves with an extensive, often emarginate hunch superseding the tip of the leaf ..... **Rhombophyllum**
21b Leaves not or only moderately hunched ..... **Hereroa**
16b Leaves sharply triquetrous, ± awl-shaped:
22a Flowers and fruits solitary ..... **Khadia**
22b Flowers and fruit in exserted dichasia ..... **Bergeranthus**

Group G. Shrubs or shrublets without spines

(Plants with woody, rarely succulent, persistent stems.)

1a Leaves soft, with or without bladder cells:
2a Plants homophyllous, producing several similar leaf pairs per season:
3a Internodes with prominent hairs (elongated bladder cells) ..... **Drosanthemum**
3b Internodes without prominent distant hairs:
4a Leaf tips with apical diadems (groups of spreading bristles with a corky base) ..... **Trichodiadema**
4b Leaf tips without diadems, although sometimes with elongated bladder cells:
5a Covering membranes absent ..... **Delosperma**
5b Covering membranes present:
6a Capsules with > 10 locules ..... **Malephora**
6b Capsule with 5–8 locules:
7a Leaves as long and broad as a finger; flowers with a nectary ring ..... **Jacobsenia**
7b Leaves shorter, if as long as a finger then more slender; flowers with 5 separate nectaries:
8a Leaves broadly trigonous, glaucous-grey, often dentate ..... **Oscularia**
8b Leaves terete or semiterete, if trigonous, shorter than 20 mm:
9a Inflorescences mostly as solitary flowers ..... **Lampranthus**
9b Inflorescences distinctly differentiated from the vegetative part, very floriferous, bracteate and bracteolate:
10a Leaves terete, up to 60 mm long, apically rounded ..... **Scopelogena**
10b Leaves trigonous, up to 30 mm long, apiculate ..... **Mestoklema**
2b Plants heterophyllous, producing two leaf pairs per season:
11a Leaves toothed ..... **Hammeria**
11b Leaves not toothed:
12a Basal parts of old leaf sheaths sclerotic, completely enveloping the stem ..... **Monilaria**
12b Old leaf sheaths papery or parchment-like:
13a Bracteoles connate, forming a cup enclosing the base of the flower ..... **Dicrocaulon**
13b Bracteoles well below the flower:
14a Both leaf pairs of a season connate for > 30% of their length ..... **Meyerophytum**

14b First leaf pair of a season connate for > 25% of its length, spreading, the second connate for > 50%, erect.....
.....**Mitrophyllum**

1b Leaves firm:
15a Leaves continuous with succulent, green internodes:
16a Fruit 5–7-locular:
17a Capsules without closing bodies, with valve wings; seeds echinate ..... **Braunsia**
17b Capsules with closing bodies, without valve wings; seeds smooth or papillate ..... **Ruschia**
16b Fruit >8-locular:
18a Capsules 10- or more-locular:
19a Leaves more than 50 mm long, semiterete, tip blunt ..... **Leipoldtia**
19b Leaves less than 20 mm long, triquetrous, tip spiny ..... **Polymita**
18b Capsules 8-locular:
20a Covering membranes reduced ..... **Zeuktophyllum**
20b Covering membranes well developed:
21a Valves basally connate, only tips expanding once, capsule then staying open ..... **Stayneria**
21b Valve free to base, capsule opening repeatedly ..... **Smicrostigma**
15b Leaves clearly distinct from the wooden internodes:
22a Leaves longer than internodes, dominating the aspect (succulent shrubs):
23a Leaves almost globular, shaped like a grape .....**Jensenobotrya**
23b Leaves trigonous to terete:
24a Internodes shiny, spongy ..... **Jordaaniella**
24b Internodes rough from peeling bark:
25a Foliage leaves slender, digitiform, leaves in inflorescence trigonous, much shorter ..... **Ottosonderia**
25b Leaves similar:
26a Seeds echinate:
27a Capsules with closing bodies, without valve wings .....**Astridia**
27b Capsules without closing bodies, with valve wings ..... **Braunsia**
26b Seeds glabrous or papillate:
28a Capsules without covering membranes:
29a Fruit not closing properly after opening..... **Corpuscularia**
29b Fruit opening and closing repeatedly when wetted.....**Hartmanthus**
28b Capsules with covering membranes:
30a Capsules with closing bodies:
31a Capsules 5-locular .....**Astridia**
31b Capsules > 10-locular:
32a Fruit in persistent inflorescences to which partial inflorescences are added each season; valve wings rectangular..... **Cephalophyllum**
32b Fruit solitary or in dichasia, sometimes persistent; valve wings tapering slightly ..... **Schlechteranthus**
30b Capsules without closing bodies:
33a Valve wings absent:
34a Flowers bright magenta.....**Enarganthe**
34b Flowers white to pink .....**Wooleya**
33b Valve wings present:
35a Capsules 5-locular..... **Hereroa**
35b Capsules > 8-locular:
36a Flowers bright magenta.....**Namaquanthus**
36b Flowers white:
37a Calyx 4-lobed..... **Juttadinteria**
37b Calyx 6–8-lobed ..... **Jacobsenia**
22b Leaves shorter than internodes, aspect dominated by woody stems (woody shrubs):
38a Capsules 5-locular (rarely up to 10 locules):
39a Fruits woody, dispersal units nutlets.....**Ruschianthemum**
39b Fruit loculicidal capsules:
40a Capsules opening only once completely:
41a Seeds flat, dispersal by wind..... **Stoeberia**
41b Seeds roundish, dispersal by rain.....**Erepsia**
40b Capsules opening repeatedly:
42a Capsules with closing bodies:
43a Valve wings absent ..... **Ruschia**
43b Valve wings present:
44a Closing bodies large, locules shallow ..... **Antimima**
44b Closing bodies small, locules deep:
45a Capsules breaking away from pedicels; plants therefore ± spiny..... **Eberlanzia**
45b Capsules remaining on pedicels.....**Amphibolia**

42b Capsules without closing bodies:
46a Valve wings broad:
47a Leaves rough from tiny elevations ..... **Rhinephyllum**
47b Leaves smooth, glabrous:
48a Valve wings rectangular ..... **Lampranthus**
48b Valve wings narrowed towards the tip ..... **Circandra**
46b Valve wings absent or narrow:
49a Valve wings absent, expanding keels short and radial ..... **Esterhuysenia**
49b Valve wings narrow (rarely broader), expanding keels longer, diverging ..... **Erepsia**
38b Capsules > 8-locular:
50a Plants with a compact centre and long shoots:
51a Long shoots procumbent but never rooting ..... **Hallianthus**
51b Long shoots erect, later leaning in other shrubs:
52a Plants homophyllous; leaves with dentate margins ..... **Odontophorus**
52b Plants heterophyllous (first leaf pair of a branch highly connate); leaves entire, mucronate ..... **Vanzijlia**
50b Plants without a compact renewal centre of assimilating short shoots:
53a Capsules without closing bodies ..... **Erepsia**
53b Capsules with closing bodies:
54a Covering membranes straight ..... **Octopoma**
54b Covering membranes distally recurved and undulate ..... **Leipoldtia**

Group H. Shrubs or shrublets with spines

1a Capsules 6–9-locular:
2a Valve wings rectangular, broader than expanding keels; more spines than fruits per inflorescence; closing bodies large; internodes often shorter than leaves ..... **Leipoldtia**
2b Valve wings reduced to awns or absent; few spines per inflorescence; closing bodies medium-sized, hook-shaped ..... **Ruschia**
1b Capsules 5-locular (very rarely 4- or 6-locular):
3a Closing bodies absent ..... **Mestoklema**
3b Closing bodies present:
4a Closing bodies large, white; covering membranes without additional closing devices ..... **Arenifera**
4b Closing bodies small, translucent to glassy; covering membranes with closing rodlets:
5a Valve wings broad; blunt spines derived from pedicels after the ripe fruit has been shed ..... **Eberlanzia**
5b Valve wings absent or very narrow; sharp spines developed from pedicels after abortion mainly of buds or flowers ..... **Ruschia** subgenus **Spinosa**

Acrodon N.E.Br. 2405001

(Ruschioideae: 10. Ruschia Group)
Brown: 12 (1927a); Herre: 62 (1971); Glen: 212 (1986); Hartmann: 29 (1996b); Burgoyne (1998); Smith *et al.*: 178 (1998).

Compact, tufted perennials up to ± 100 mm high, rarely creeping, internodes usually ± hidden by sheathing leaf bases. **Leaves** opposite, crowded in basal rosette, sharply triquetrous, 30–50 mm long, keel and margins often with small teeth, spreading, reflexed, smooth, grey-green to dark green. **Flowers** solitary, bracteate, ± 40 mm in diameter; opening midday, closing by evening. **Sepals** 5 or 6, nearly equal, ovate, sometimes with membranous margins. **Petals** 1–3-seriate, narrowly linear-lanceolate, often emarginate, white to pink, usually with a conspicuous pink to magenta centre line and sometimes also with darker-coloured margins and tip. **Stamens**: filaments connivent to erect, papillate at least at base, white to reddish above; anthers white; staminodes 0 to few. **Nectary** a crested, dark green ring. **Ovary** top conical; stigmas 5, ± broadly subulate, short, plumose; placentation parietal. **Fruit** a 5-locular capsule, nearest Ruschia type, woody, valves opening incompletely; valve wings awn-like or rarely absent; expanding keels slightly diverging; covering membranes stiff, complete; closing bodies large, lens-shaped. **Seeds** pear-shaped, rough with microscopic ± spherical knobs, dark brown to almost black. $x = 9$ (1 report).

Flowering in early spring.

Distinguishing characters: tufted or creeping perennials with sharply triquetrous leaves which are toothed on keel and at apex; solitary flowers usually with striped petals and white pollen; fruit with lens-shaped closing bodies.

Species 4, found in a broad band in the coastal region of SW and S Western Cape, including wetter parts of the Little Karoo and SW Eastern Cape.

Aethephyllum N.E.Br. 2405002

(Ruschioideae: 2. Cleretum Group).
Brown: 400 (1928b); Herre: 64 (1971); Ihlenfeldt & Struck: 411 (1986); Smith *et al.*: 58 (1998).

Micropterum Schwantes: 17 (1928a) in part; Winkler: 19 (1957).

Annual procumbent herbs; stems and leaves papillate, glistening. **Leaves** ± flat, oblong to ovate in outline, irregularly lyrate-pinnatifid. **Flowers** solitary, up to 10 mm in diameter, pedicellate, ebracteate; opening in afternoon, around 16:00. **Sepals** 5, unequal, largest lanceolate. **Petals** ± 20, 2- or 3-seriate, linear-oblong, pointed, light yellow. **Stamens** usually ± 5(14), 1-seriate with filamentous papillae near base; staminodes 0. **Nectary** of 5 inconspicuous light green glands. **Ovary** vaulted above; placentas parietal; stigmas (4)5(6), filiform, ± 3 mm long, spreading. **Fruit** a (4)5(6)-locular capsule, of Mitrophyllum type; expanding sheets large, tapering into loose apical membranes; covering membranes reduced to a limb; closing bodies 0. **Seeds** with very small tubercles.

Flowering mid-winter to early spring.

Distinguishing characters: annual herbs with flat-growing habit and pinnatifid leaves; fruit on relatively long pedicels and flat on top; flowers yellow.

Species 1: *Aethephyllum pinnatifidum* L.f., restricted to a narrow north-south band in the SW part of the Western Cape; so far recorded from Gifberg near Vanrhynsdorp, the Cederberg, as well as the areas around Tulbagh, Paarl and Stellenbosch; the species forms part of the early post-fire vegetation in fynbos.

Aloinopsis Schwantes 2405003

(Ruschioideae: 6. Titanopsis Group).

Schwantes: 177 (1926c); Bolus: 372 (1958a); Herre: 66 (1971); Smith *et al.*: 156 (1998).

Acaulon N.E.Br.: 76 (1928d). *Aistocaulon* Poelln. ex H.Jacobsen: 123 (1935).

Compact, tufted, dwarf perennials with tuberous rootstock. **Leaves** in a dense rosette, ovate to spatulate in outline, in section fairly flat to 3-angled to almost semiterete, often conspicuously tuberculate or punctate. **Flowers** solitary or occasionally in twos or threes, pedicellate, 18–40 mm in diameter, usually bracteate, opening in afternoon, closing sunset or opening towards evening and closing before dawn. **Sepals** 5 or 6, nearly equal, erect or recurved, obtuse, acute or acuminate, with narrow membranous margins. **Petals** 2- or 3-seriate, yellow, salmon, flesh-pink or rose, the yellow ones sometimes with a red, central stripe. **Stamens** with filaments papillate towards base; staminodes 0. **Nectary glands** angular, in a ring. **Ovary** flat, convex or subglobosely or conically elevated above; placentas parietal; stigmas 6–14, slender, ± as long as stamens. **Fruit** a 6–14-locular capsule of Titanopsis type, nearly flat to conical above, semiglobose, convex, obconic or nearly flat below; expanding keels parallel, diverging at tips; covering membranes complete or relictual; valve wings well developed; closing bodies 0, rudimentary or well developed. **Seeds** broadly obovate, minutely tuberculate to nearly smooth, brown.

Flowering from late winter to early spring.

Distinguishing characters: rosette-forming perennials with rough, spoon-shaped leaves; roots tuberous; flowers with striped petals; seeds ovoid.

Species 14, predominantly in the Great and Little Karoo, in the Western and Eastern Cape, extending slightly into the S Northern Cape; a single outlier: *Aloinopsis orpenii* (N.E.Br.) L.Bolus, northeastern corner of the Northern Cape.

Amphibolia L.Bolus 2405005

(Ruschioideae: 12. Eberlanzia Group).

Bolus: 169 (1965); Herre: 70 (1971); Toelken & Jessop: 64 (1976); Hartmann & Dehn: 179 (1989); Hartmann: 34 (1996b); Hartmann: 44 (1998c); Smith *et al.*: 316 (1998).

Eberlanzia Schwantes: 189 (1926b), in part. Hartmann & Stüber: 63 (1993).

Sprawling shrubs, up to 400 mm high, 700 mm in diameter; stems light-coloured. **Leaves** opposite, connate at bases, ascending-spreading, club-shaped with rounded tips, light green to greyish, surfaces smooth, waxy. **Flowers** solitary or in threes, shortly pedicelled with pink bracts. **Sepals** 5, nearly equal, sometimes with narrow, membranous margins. **Petals** 2-seriate, obtuse or subacute, light violet and creamy white, with distinct colour pattern: a dark area at the tip with a thin dark line running down to base, where it broadens and darkens, dark bases of all petals forming a clearly demarcated ring surrounded by a creamy whitish region, resulting in a characteristic star-like pattern. **Stamens** conically arranged; filaments often papillate; staminodes papillate. **Nectary** a crenulate ring. **Ovary** slightly conical above; placentas parietal; stigmas 5, subulate, purple. **Fruit** a capsule, whitish, often filled with spongy tissue, 5-locular with locules deep and narrow, obconical, once open does not close again; valves with rectangular wings (as in Lampranthus type); expanding keels diverging, touching at their bases; covering membranes with closing rodlets or thick closing ledges on distal undersurfaces; closing bodies small, white, endocarpal, sometimes deep in the locule. **Seeds** subglobose or slightly narrowed to one end, brown, glossy.

Flowering in summer.

Distinguishing characters: white-stemmed shrubs; fruit with valve wings, without covering membranes; flowers with star-like colour pattern.

Species 5, coastal plains of Namibia between Lüderitz and Oranjemund and southwards to Namaqualand in the Northern Cape, to the Cape Peninsula in the Western Cape.

Antegibbaeum Schwantes ex C.Weber 2405007

(Ruschioideae: 9. Lampranthus Group).

Weber: 9 (1968); Herre: 74 (1971); Smith *et al.*: 134 (1998).

Dense, tufted, dwarf perennials; branches erect to prostrate, up to 100 mm long, radiating from a small woody stem. **Leaves** ± digitiform, one slightly anisomorphic leaf pair per branch; upper surface flat or slightly convex; lower surface rounded and compressed towards obtuse apex; grey-green or somewhat reddish, smooth or slightly rugose. **Flowers** on short pedicels, 60 mm in diameter; with 2 pairs of bracts below flowers and fruit (unlike *Gibbaeum*); opening from midday until evening. **Sepals** 6, unequal, 2 lateral the longest, often keeled and with membranous margins. **Petals** 1–3-seriate, free, linear, often flaccid, violet-red. **Stamens** bearded at base; staminodes present or 0. **Nectary** a crenulate ring (unlike *Gibbaeum*). **Ovary** often raised above body of receptacle; placentas parietal; stigmas 6, stout, subulate, plumose. **Fruit** a 6-locular capsule, of Lampranthus type, shortly conical to convex, with prominent sutures; valve wings broad; covering membranes present; closing bodies 0. **Seeds** echinate, brown. $x = 9$ (1 report).

Flowering late winter to early spring.

Distinguishing characters: large magenta flowers (60 mm diameter), pedicel with 2 pairs of bracts; nectary annular; seeds echinate.

Species 1: *Antegibbaeum fissoides* (Haw.) Schwantes ex C.Weber., restricted to the semi-arid Little Karoo in the Western Cape.

Antimima N.E.Br. emend. Dehn 2405129

(Ruschioideae: 11. Leipoldtia Group).

Brown: 211 (1930a); Dehn: 189 (1988); Hartmann: 229 (1996a); Hartmann & Stüber: 1 (1993); Hartmann: 67 (1998b); Smith *et al.*: 246 (1998).

Ruschia Schwantes: 186 (1926b) in part.

Compact, tufted, mat-forming or shrubby perennials, often with a compact centre forming long shoots; isophyllous or heterophyllous. **Leaves** of isophyllous species boat-shaped with convex sides, to nearly finger-shaped, often keeled in upper part, of heterophyllous species mostly oval and very often connate for at least part of their length, enveloping subsequent leaf pair during resting season, mucronate, epidermis cells flat to papillate, with wax cover smooth or, in papillate forms, with a smooth lateral channel and wax flakes or platelets on remaining surface. **Flowers** 1(–3), rarely in well-

developed cymes; bracts and bracteoles present; opening in the morning and closing in evening; sometimes strongly scented. **Petals** often arranged in 5, rarely 6 groups, pink to purple, rarely white; staminodes mostly in a central cone surrounding stamens closely. **Nectary** a crenulate ring. **Ovary** with basal-parietal placentas; stigmas 5(6), subulate. **Fruit** a 5(6)-locular capsule, close to Leipoldtia type, stalked, always with persisting bracteoles, top with high or low valve rims, base mostly bowl-shaped, sometimes funnel-shaped; covering membranes undulate, more rarely straight, mostly elevated in centre, in several species with radial or tangential wings or other protrusions on them; closing bodies large, rarely small and 0 in one species; expanding keels broad, diverging and radial in distal part, reaching tip of valve; valves with or without mostly narrow valve wings.

Flowering throughout the year with a peak in winter.

Distinguishing characters: variable perennials, sometimes heterophyllous; leaves often rough-textured; 5-locular capsules with large, stalked, white closing bodies.

Species 99, most species occur in the winter-rainfall area along the southwestern coast, from near Aus in Namibia to the south, extending into South Africa as far as the Eastern Cape. Only a few species are found in the Great Karoo of the Northern Cape and Free State.

Apatesia N.E.Br. 2405008

(Ruschioideae: 1. Apaptesia Group).
Brown: 12 (1927); Brown: 80 (1928); Brown: 262 (1932); Herre: 76 (1971); Ihlenfeldt & Gerbaulet: 457 (1990); Smith *et al.*: 60 (1998).

Annual herbs with decumbent branches, the initial rosette developing into a rich, dichasial inflorescence. **Leaves** flat to slightly channelled, strictly decussate with petiole dilated below and sheathing; epidermis covered with wax flakes. **Flowers** solitary on long pedicels; open in daylight hours. **Sepals** 5, united slightly beyond union with ovary into a saucer-shaped limb, unequal, narrowly spatulate from a broad base, inner ones with broad, membranous margins, longest one often longer than petals. **Petals** 4- or 5-seriate, free, widely spreading, arising from saucer-shaped limb of calyx, their margins ciliate; yellow. **Stamens** and **staminodes** many, from saucer-shaped limb of calyx, inner filaments bearded at base. **Nectary** a flat ring with emarginate rim. **Ovary** flat on top and sunk below rim of calyx; placentas parietal; stigmas 8–12, stout, 2 mm long. **Fruit** a 8–12-locular capsule, shallow, slightly convex beneath; valves horizontally spreading when expanded, narrowly deltoid; expanding keels ± half as long as valve and subcontiguous into a central keel, very small covering membranes present; *A. sabulosa* has valves with a narrow membranous rim (valve wings 0 in the other 2 species); complete seed-pockets present at base. **Seeds** globose, smooth. $x = 9$.

Flowering in early summer.

Distinguishing characters: annual herbs with flat, stalked leaves; pedicels long; seeds many, a few developing in seed-pockets (paraspermy); flowers yellow.

Species 3, Western Cape, in a broad band parallel to the west coast from Vanrhynsdorp to Cape Town.

Aptenia N.E.Br. 2405009

(Mesembryanthemoideae)
Brown: 412 (1925); Herre: 78 (1971); Bittrich: 5 (1986); Smith *et al.*: 28 (1998); Gerbaulet (in press).

Platythyra N.E.Br.: 412 (1925); Herre: 250 (1971). *Litocarpus* L.Bolus: t. 261 (1927b) name illegitimate.

Small perennial shrubs or climbers, prostrate or decumbent, with fibrous roots, rarely with fleshy rootstock; stems 4-angled or terete, weakly lignified, green and succulent with additional vascular bundles, epidermal bladder cells tall and closely packed. **Leaves** decussate or occasionally becoming alternate in inflorescences, with or without petiole, flat or semicylindrical, heart-shaped, ovate or linear, papillose with loosely arranged bladder cells, rarely deciduous. **Flowers** solitary or in few-flowered dichasia, pedicellate, 15–35 mm in diameter; open in daylight. **Sepals** 4, 2 often larger, basally fused or free towards base. **Petals** united at base into a short tube; white, pale pink, cream to yellowish, staminodes 0 or present. **Nectary** consisting of 4 separate grooves. **Ovary** conical above; placentas axile; stigmas 4, subulate, minute. **Fruit** a 4-locular capsule, of Mesembryanthemum type, with or without valve wings; expanding keels extending to centre of fruit. **Seeds** D-shaped, 1.3–1.5 mm long, rough, blackish brown. $x = 9$.

Flowering spring, summer and autumn.

Distinguishing characters: green succulent stems with closely arranged bladder cell idioblasts; seeds large and blackish brown.

Species 4, naturally in the summer-rainfall areas of sthn Afr., *Aptenia cordifolia* (L.f.) Schwantes and *A. lancifolia* L.Bolus are frequently found in shady places on rocky outcrops in regions of higher rainfall. The natural distribution of *A. cordifolia* is unclear as it becomes easily established in areas beyond its natural distribution. *Aptenia* is used world-wide as an ornamental in suitable climates.

Arenifera A.G.J.Herre 2405010

(Ruschioideae: 10. Ruschia Group).
Herre: 35 (1948); Hartmann: 29 (1996b); Smith *et al.*: 346 (1998).

Shrublets, ± 150 mm high, densely branched. **Leaves** slightly connate at base, members of a leaf pair somewhat unequal in size and shape; younger ones green and viscid, increasingly covered by adhering dust and sand with age, surface glaucous and rough, with warty elevations above the subhypodermal tannin idioblasts, obtuse, somewhat convex; up to 25 mm long and 5 mm broad and thick, somewhat curved and blunt above and along sides; shorter leaves 6–15 mm long, ± 7 mm diameter. **Flowers** in ternate inflorescence, with lateral ones sometimes developing rather slowly; peduncle terete, central pedicel without bracts; flowers open at midday. **Petals** 2-seriate, recurved, linear, obtuse or subacute, ± 22 mm in diameter, pale rose to light violet, with an inconspicuous, central band. **Sepals** 4, almost equal, interior ones with a broad, membranous margin. **Stamens** with surrounding staminodes; filaments sparingly bearded at base; anthers and pollen whitish. **Nectary** a dark green crenulate ring. **Ovary** slightly convex above; placentas parietal; stigmas 8, long, subulate, conspicuously fringed at base. **Fruit** a 8-locular capsule, of Ruschia type but with valve wings, turbinate, ± 8 mm in diameter, woody, cupular, margins of valves prominent, forming a small column in centre; valves transversely ribbed, with 2 conspicuous, recurved teeth at tip; valve wings large; expanding keels parallel, diverging widely at tips; covering membranes half covering locules, additional closing devices (projections) at opening; closing bodies conspicuous. **Seeds** long, quadrangular, somewhat convex, finely ribbed longitudinally, light yellowish brown.

Flowering autumn and winter.

Distinguishing characters: many-branched perennials with reddish brown stems; leaves often with adhering sand; fruit 6–8-locular.

Species 4, Northern and Western Cape, from the Richtersveld to Calvinia in the Northern Cape, and the Knersvlakte to Matjiesfontein in the Western Cape.

Argyroderma N.E.Br. 2405011

(Ruschioideae: 11. Leipoldtia Group).
Brown: 92, 105 (1922a); Herre: 82 (1971); Hartmann: 121 (1977); Smith *et al.*: 82 (1998).

Roodia N.E.Br.: t. 78 (1922b).

Compact, dwarf perennials, rarely tufted, sometimes single-bodied, rarely subterranean, branching from base, each stem or branch with 2 or, when new leaf pairs are forming, 4–6 leaves. **Leaves** opposite, finger-shaped, hood-shaped, semi-ovoid or semiglobose, united at base, erect or spreading, with upper surface flat or slightly convex, lower surface convex, silvery to grey-green. **Flowers** solitary, terminal, with a distinct hypanthium into which stamens bend; opening at midday and closing in afternoon. **Sepals** 6–8, produced above ovary into a short tube. **Petals** many, arising from top of calyx tube, free, in shades of yellow, purple, or red, rarely white. **Stamens** many; staminodes 0 or few. **Ovary**: placentas parietal or basal; stigmas united into a small, entire or slightly crenate and disc-like cushion. **Nectary** annular. **Fruit** a 12–25-locular capsule, of Leipoldtia type, broad and shallow; covering membranes rather rigid; closing bodies large, nearly closing outer opening of locules; valve wings rather narrow; expanding keels stout, awned. **Seeds** subglobose, small, smooth, brown. $x = 9$.

Flowering autumn and early winter.

Distinguishing characters: rounded, highly succulent perennials, single-bodied or tufted; leaves smooth, silver to grey-green; flowers solitary, with distinct hypanthium and stigmas fused into a disc.

Species 11, northwestern part of the Western Cape. It has a restricted distribution in southern Namaqualand in an area known as the Knersvlakte.

Aridaria N.E.Br. 2405012

(Mesembryanthemoideae).
Brown: 433 (1925); Friedrich: 16 (1970); Herre: 84 (1971); Gerbaulet: 41 (1996a); Smith *et al.*: 30 (1998).

Manettia Adans.: 242 (1763) name illegitimate. *Nycteranthus* Necker ex Rothmaler: 413 (1941) name illegitimate. *Phyllobolus* subgen. *Aridaria* (N.E.Br.) Bittrich: 74 (1986); Hartmann: 47 (1993).

Shrubs, low growing or up to 1 m high and erect; branches much lignified; cortical bundles 0; epidermal bladder cell idioblasts small and much flattened; roots thickened. **Leaves** decussate throughout and shortly connate at base, subcylindrical, deciduous; with distinct central water storing tissue. **Flowers** in dichasia, up to 40 mm in diameter, white or bright pink on inside, suffused in different shades on outside; open during day, evening, or night. **Sepals** 4; sepals, petals and stamens basally connate into a short tube. **Petals** in several series, narrowly linear, white or pink, suffused in different shades of yellow, copper, pink or red on outside. **Stamens** erect; pollen tricolpate, tectum punctate or punctate-foveolate, microspinulose or spinulose. **Nectary** composed of 4 shell-shaped depressions. **Ovary** semi-inferior, placentation axile; stigmas 4 or 5, subulate, 3–5 mm long. **Fruit** a Mesembryanthemum type capsule, 4- or 5-locular, hygrochastic, usually opening and closing repeatedly, rarely opening only once and not closing again; expanding keels parallel; valve wings present; fruit breaking off easily and stalks becoming spiny. **Seeds** D- or horseshoe-shaped, ± 1.5 mm long, brown or dark brown, with or without a crest; testa cells with central papillae, in distinct or indistinct concentric rows. $x = 9$ (polyploidy).

Flowering spring to early summer.

Distinguishing characters: stems woody; leaves with flattened bladder cell idioblasts; upper and lower parts of fruits of equal proportions.

Species 4, southern and central Namibia and in karroid areas of the Western, Eastern and Northern Cape.

Aspazoma N.E.Br. 22405013

(Mesembryanthemoideae).
Brown: 413 (1925); Herre: 86 (1971); Bittrich: 5 (1986); Smith *et al.*: 32 (1998).

Shrublets up to ± 150 mm high. **Leaves** more than 2 to a branch, some alternate, others opposite, semiterete or subtrigonous to ± terete, basally free but enveloping each other, forming a prominent sheath, with slightly xeromorphic bladder-cells. **Flowers** terminal, solitary, ± 40 mm diameter, white to pale yellow. **Sepals** 4 or 5, with 2 lobes foliaceous, others shorter and more membranous, united into a short tube above ovary. **Petals** 2- or 3-seriate, linear, united into a short tube at base, white to pale yellow. **Stamens** and **staminodes** many, erect; pollen punctate-foveolate, microspinulose. **Nectary** a ring with ± entire rim. **Ovary** conical with axile placentas. **Fruit** a 4- or 5-locular capsule, of Mesembryanthemum type; expanding keels with a broad, inflexed or erect submembranous flap or wing on each side, locules mostly with 2 seeds only. **Seeds** 2.2 mm long, light brown, almost smooth, epicuticular sculpture very finely verrucose.

Flowering in spring.

Distinguishing characters: leaves stem-clasping; seeds large.

Species 1: *Aspazoma amplectens* (L.Bolus) N.E.Br., confined to Namaqualand, including the Richtersveld in the Northern and Western Cape.

Astridia Dinter 2405014

(Ruschioideae: 10. Ruschia Group).
Dinter: 430, 447 (1926); Friedrich: 17 (1970); Herre: 88 (1971); Glen: 203 (1986); Smith *et al.*: 348 (1998).

Robust, erect shrublets; internodes shorter than leaves; young parts variably minutely pubescent, or glabrous. **Leaves** ascending or spreading, usually decurrent, bluntly triquetrous, often subfalcate to falcate, usually 30–60 mm long, 10–30 mm in diameter, with sheath 2–6 mm long, greyish green, persistent; epidermis with convex cells or ± distinctly papillate. **Flowers** solitary or 3 together, lateral ones developing after marked interval, large, shortly pedunculate, opening in daytime; bracts embracing receptacle. **Sepals** 6, unequal, inner ones subulate, with membranous margins. **Petals** with outer ones longer, 1- or 2-seriate, inner ones narrower, 2- or 3-seriate, white, lemon, orange, pink or various shades of purple and red, centre often differently coloured. **Stamens** and **staminodes** in 6–8 series, conically collected, coloured, outer ciliately papillate in lower part, inner ones more densely papillate near middle. **Nectary** a crenulate ring. **Ovary**: apical lobes distant, acutely or obtusely compressed, rarely reaching nectary; placentas parietal; stigmas 6, subulate-caudate, rarely exceeding height of stamens. **Fruit** a 6-locular capsule of Ruschia type, obconic below; sutures strongly compressed; expanded valves widely spreading, wingless; expanding keels parallel below, diverging upwards, aristate; closing

bodies and covering membranes well developed, with 2 processes or additional closing devices on underside near exit, obconical. **Seeds** covered with long, brown, papillate hairs, shortly echinate, tuberculate or muricate. $x = 9$.

Flowering mainly in late summer.

Distinguishing characters: robust perennials, erect, woody with large grey-green, smooth or textured leaves; sheathing stems at their partially fused bases; flowers large, solitary with bracts just below them; seeds echinate, tuberculate or hairy.

Species 7, across the border between South Africa and Namibia, along the lower reaches of the Orange River. This is an extremely arid area of the Northern Cape.

Bergeranthus Schwantes 2405015

(Ruschioideae: 8. Bergeranthus Group).
Schwantes: 179 (1926c); Herre: 90 (1971); Smith *et al.*: 202 (1998).

Compact tufted perennials, branching from base into clumps, with tuberous rootstock. **Leaves** opposite, shortly connate at base, crowded, triquetrous to awl-shaped, mucronate, up to ± 130 mm long, 20 mm broad, surface dark green; epidermis ± smooth, stomata hardly sunken, surface even or somewhat elevated above subhypodermal tannin idioblasts. **Flowers** on pedicels with sheathing bracts in dichotomous cymes, but axillary flowers sometimes suppressed, ± 50 mm diameter, bracteate; opening from late afternoon to early evening, closing before midnight. **Sepals** 5, lanceolate, 3-angled, keeled with membranous margins. **Petals** in several series, linear-lanceolate, yellow, reddish on outer surface. **Stamens** erect, epapillate. **Nectary** a crenate ring. **Ovary** conical above; placentas parietal; stigmas 5, filiform or subulate, longer than stamens. **Fruit** a 5-locular capsule, close to Mitrophyllum type; with a well-developed broad spongy closing ledge; expanding keels in a more tangential position; broad, dark brown, with membranous points; covering membranes rigid; closing bodies large, somewhat trigonous. **Seeds** globose, pear-shaped or triangular-ovoid. $x = 9$ (aneuploids, polyploidy).

Flowering almost any time of the year.

Distinguishing characters: tufted perennials; leaves triquetrous, smooth; inflorescences cymose; pedicels bracteate; fruit with large, white closing bodies.

Species 10, Eastern Cape, between Graaff-Reinet and Port Elizabeth in the west and East London and Queenstown in the east.

Bijlia N.E.Br. 2405017

(Ruschioideae: 8. Bergeranthus Group).
Brown: 267 (1928); Herre: 94 (1971); Hartmann: 173 (1992a); Hammer 195 (1995); Smith *et al.*: 136 (1998).

Bolusanthemum Schwantes: 514 (1928c).

Dwarf perennials branched from base into clumps, mostly with 2 or 3 branches only. **Leaves** opposite, somewhat unequal, gibbous-trigonous with a ± rounded oblique keel, one side ± flat, the other inflated, but both sides often indented; spreading and often pushed aside by old fruit capsules situated at centre of plant; surface smooth, glaucous, whitish, stomata ± superficial, outer epidermis wall very thick. **Flowers** 1–3, shortly pedicellate, bracteate; opening at noon, closing at night. **Sepals** 5, subequal. **Petals** 2-seriate, free, cuneately linear, yellow. **Stamens** collected in a column, epapillate. **Nectary** of 5 separate glands. **Ovary** slightly conical above; placentas parietal; stigmas 5, filiform. **Fruit** a 5-locular capsule; valves erect in expanded capsule; valve rims broad; close to Mitrophyllum type with well-developed hood-shaped closing bodies and short ± tangential expanding keels gradually merging into expanding sheets; covering membranes present, slightly stiff, with acute depressions between ridges. **Seeds** acutely ovoid, several per locule. $x = 9$ (1 report).

Flowering in autumn.

Distinguishing characters: perennials with boat-shaped, unequal, light green to yellowish white leaves; flowers large, yellow; fruit persistent.

Species 2, rather restricted distribution in the Western Cape where it occurs near the small town of Prince Albert.

Braunsia Schwantes 2405018

(Ruschioideae: 9. Lampranthus Group).
Schwantes: 644 (1928c); Bolus: 306 (1967); Herre: 96 (1971); Smith *et al.*: 276 (1998).

Echinus L.Bolus: t. 266 (1927).

Compact, erect to prostrate shrublets. **Leaves** opposite, nearly equal, connate up to half their length, triquetrous, sometimes apiculate, with serrate and cartilaginous keels and margins, ± 25 mm long, 15 mm broad; velvety from long papillae, stomata overarched by papillae, outer epidermal wall thick. **Flowers** 1(–3), solitary or in cymes, pedicellate or occasionally sessile, ± 40 mm in diameter; opening midday to late afternoon. **Sepals** 5, exterior 2 flattened, inner ones with conspicuous, membranous margins. **Petals** 1–5-seriate, purple to pink, rarely white. **Stamens**: filaments slightly ciliate-papillate; staminodes present. **Nectary** an inconspicuous, minutely crenulate ring. **Ovary** slightly elevated to slightly concave; placentas parietal; stigmas (4)5(–7), subulate. **Fruit** a (4)5(–7)-locular capsule, of Lampranthus type but covering membranes not as broad and long as in typical form; lacking closing ledges; expanding keels parallel, lacerate, aristate; covering membranes well developed or reduced to a limb; closing bodies 0; valve wings present. **Seeds** somewhat globose, echinate. $x = 9$ (1 report).

Flowering from mid-summer to early winter.

Distinguishing characters: shrublets with leaves fused for half their length, often with cartilaginous or serrated edges, sometimes velvety with a sharp tip; seeds echinate.

Species 5, southwestern part of South Africa, mostly in arid areas of the Western and S Northern Cape including the Little Karoo, and at Matjiesfontein and Laingsburg in the Great Karoo.

Brownanthus Schwantes 2405135

(Mesembryanthemoideae).
Schwantes: 14 (1927d); Ihlenfeldt & Bittrich: 289 (1985); Bittrich: 5 (1986); Pierce & Gerbaulet: 42 (1997); Smith *et al.*: 34 (1998).

Pseudobrownanthus Ihlenf. & Bittrich: 319 (1985).

Decumbent to erect shrubs, 150–1000 mm high, with fibrous roots; stems (young) weakly lignified, articulate, green and succulent; epidermal bladder cells tall, closely packed; old stems woody. **Leaves** decussate, ± terete, free or shortly fused towards bases, ephemeral, sometimes spinescent; bladder cells at base and edges often becoming hair-like. **Flowers** solitary or in dichasia, 5–25 mm diameter; open during daylight hours. **Sepals** 4 or 5, ± equal, consistently erect during anthesis. **Petals** free towards bases, cream; staminodes 0. **Nectary** consisting of 4 or 5 separate grooves. **Ovary** with axile placentas; stigmas 4 or 5. **Fruit** a 4- or 5-locular

capsule, of Mesembryanthemum type, rarely nut-like; expanding keels extending to centre of fruit; valve wings present; sometimes with a basal seed pocket, then expanding keels not separated by placenta. **Seeds** D- or pear-shaped, 1–1.3 mm long, surface mostly smooth, rarely rough, ochre or brown. $x = 9$ (polyploidy).

Flowering spring to early summer.

Distinguishing characters: stems succulent, later becoming woody; different arrangements of bladder cell idioblasts on stems (closely packed) and leaves (loosely arranged); leaves free or shortly fused at the bases.

Species 10, both summer- and winter-rainfall regions of the Western and Northern Cape, also in Namibia and extending into Angola.

Calamophyllum Schwantes 2405019

(Ruschioideae: uncertain).
Schwantes: 15, 28 (1927d); Herre: 98 (1971); Smith *et al.*: 204 (1998).

Tufted perennials, often with visible internodes, up to 200 mm high. **Leaves** opposite, crowded, ± club-shaped, nearly terete at base, upper surface ± flat towards apex, bluish green. **Flowers** solitary, terminal, 30–50 mm in diameter; peduncle ± as long as leaves; opening in afternoon. **Sepals** 4, unequal. **Petals** in several series, sometimes obtuse or emarginate, uniformly red to red with a white centre. **Stamens** white or red, with red anthers. **Ovary** 10–12-locular, with parietal placentas; stigmas as many as locules, diverging. **Fruit** and **seeds** unknown.

Distinguishing characters: plants may be distinguished by their bluish green, ± club-shaped, angled leaves with blunt tips; capsules 10–12-locular.

Species 3, natural distribution is unknown. The genus is based on cultivated specimens described originally by Haworth in 1794 under *Mesembryanthemum* and has not since been definitely identified.

Carpanthea N.E.Br. 2405020

(Ruschioideae: 1. Apatesia Group).
Brown: 412 (1925); Herre: 100 (1971); Ihlenfeldt & Gerbaulet: 457 (1990); Smith *et al.*: 62 (1998).

Macrocaulon N.E.Br.: 12 (1927a).

Annual herbs; stems papillate, glistening, woolly. **Leaves** opposite, decussate, radical or on lower part of flowering branches, blade shorter than petiole, somewhat connate at base, spatulate or lanceolate, obtuse, 3-nerved, with scattered white hairs, margins ciliate with elongated bladder cells. **Flowers** 1–3, terminal, principally in dichasia, pedicellate, bracteate, 40–70 mm diameter; open during afternoon, closing up tightly into a twisted tip at night. **Sepals** 5, unequal, 2 outer foliaceous, inner ovate with membranous margin. **Petals** linear, acute, with ciliate margins, free or nearly so, golden yellow with reddish tinge towards tips, slender. **Stamens** and **staminodes** many. **Nectary** a ring with entire rim. **Ovary** broader than deep; placentas basal; stigmas 12–18, filiform, acute. **Fruit** a 12–18-locular capsule, firm, persistent septa overarching locules from sides; placenta raised by a false basal septum, broader than deep; valves narrow, with a pair of closely contiguous expanding keels ending in awns; locules without covering membranes and with narrow exit for seeds. **Seeds** roundish. $x = 9$.

Flowering late spring to early summer.

Distinguishing characters: annual herbs with flat, green leaves; stems hairy; flowers yellow; fruit 12–18-locular with contiguous expanding keels ending in awns.

Species 1: *Carpanthea pomeridiana* (L.) N.E.Br., in the extreme SW parts of Western Cape.

Carpobrotus N.E.Br. 2405021

(Ruschioideae: ? 9. Lampranthus Group).
Brown: 433 (1925); Herre: 102 (1971); Wisura & Glen: 76 (1993); Smith *et al.*: 252 (1998).

Robust trailing perennials, forming large mats; stems maroon to yellow, sometimes narrowly winged, with ± upright flowering branches. **Leaves** opposite, slightly united at base, sharply 3-angled, up to 150 mm long, green or grey-green, often tinged with a reddish hue, margins and keel cartilaginous and often serrate. **Flowers** large, up to 150 mm diameter, terminal, pedicellate, borne on bracteate stalks; base of flower two-ridged tapering into flower stalk; opening in morning and closing at night. **Sepals** 5, equal or unequal. **Petals** free, white, yellow or various shades of purple or pink. **Stamens** many. **Nectary** a crenulate ring. **Ovary**: placentas parietal; stigmas 4–20, radiating, plumose. **Fruit** fleshy-succulent, indehiscent, 4–20-locular, often edible. **Seeds** large, obovoid, slightly compressed, on long funicles, embedded in a sticky mucilage. $x = 9$.

Flowering from early spring to summer.

Distinguishing characters: robust perennials, trailing; leaves triquetrous, smooth, long; flowers large, up to 150 mm in diameter; fruit fleshy, seeds embedded in mucilage.

Species 13; 7 in sthn Afr., along the coast at low altitudes, with few species found inland. Species of *Carpobrotus* are cultivated and have been introduced worldwide into areas with suitable climates; in some parts of the United States of America they have escaped cultivation and are invading natural vegetation types.

Carruanthus (Schwantes) Schwantes 2405022

(Ruschioideae: 8. Bergeranthus Group).
Schwantes: 106 (1927d); Herre: 104 (1971); Smith *et al.*: 180 (1998).

Tischleria Schwantes: 78 (1951).

Compact, tufted perennials branching from base into clumps, with tuberous rootstock. **Leaves** opposite, crowded, slightly connate at base, trigonous, upper surface flat or somewhat concave, lower surface deep and obtusely keeled, toothed along margins towards apex, keel not toothed, grey to glossy-green, unmarked, up to ± 60 mm long, 18 mm broad. **Flowers** 1–3, solitary or in dichotomous cymes, 40–50 mm in diameter; peduncle 2-angled, shorter than leaves, with 1 or 2 pairs of bracts; pedicels ± erect, ± 100 mm long, slender, twice as long as leaves; opening in late afternoon and staying open a little after dark. **Sepals** 5, subequal, somewhat keeled. **Petals** linear-lanceolate, yellow with orange to reddish tips. **Stamens** yellow, epapillate. **Nectary** of 5 separate, crenulate glands. **Ovary** conical above; placentas parietal; stigmas 5, filiform or subulate, recurved. **Fruit** a 5-locular capsule; close to Mitrophyllum type, but with narrow valve wings; resembling capsules of *Hereroa* or *Bergeranthus*; rims of valves very high and expanding keels diverging on valves, not reaching deep into locule, both features resulting in an incomplete opening of valves; covering membranes reduced to a limb; closing bodies reduced or 0. **Seeds** ± pear-shaped or orbicular, ± 1 mm long. $x = 9$ (1 report).

Flowering late winter to early summer (*Carruanthus ringens* (L.) Boom) or spring to early summer (*Carruanthus peersii* L.Bolus).

Distinguishing characters: perennials with tuberous roots and toothed, smooth, yellowish green leaves; flowers yellow, pedicel long (up to 100 mm).

Species 2, restricted to areas around Willowmore, straddling the border between the Western and Eastern Cape.

Caryotophora Leistner 2405023

(Ruschioideae: 1. Apatesia Group).
Leistner: 289 (1958a); Herre: 106 (1971); Ihlenfeldt & Gerbaulet: 457 (1990); Smith *et al.*: 64 (1998).

Low, slightly succulent glabrous perennials, with suckers arising from a thick laterally spreading root, each giving rise to a very short stem bearing a tuft of leaves and decumbent annual flowering branches. **Leaves** alternate or subopposite, lanceolate-spatulate, obtuse or subacute, flat, decurrent and stem-clasping at base, entire, ascending, dark green, mesomorphic. **Flowers** solitary, terminal, 40–60 mm in diameter, peduncle 30–100 mm long; opening by day. **Sepals** 5. **Petals** linear-attenuate, white. **Stamens** and **staminodes** incurved; filaments papillose near base. **Nectary** a crenulate ring. **Ovary** 3- or 4-locular, receptacle subturbinate, slightly convex on upper surface; placentas axile; stigmas 3 or 4, subulate. **Fruit** a schizocarp, with 3 or 4 bilocular, nut-like, woody mericarps, with a single ovule in each locule. **Seeds** reniform, up to 2 mm long, verrucose, reddish brown.

Flowering from spring to early summer.

Distinguishing characters: flat, smooth, slightly succulent, lance- to spoon-shaped leaves; fruit comprising 3 to 4 nut-like parts; flowers white.

Species 1: *Caryotophora skiatophytoides* Leistner, with a very restricted distribution to the west of Cape Agulhas, the southernmost point of Africa, in the Western Cape. It is known only from sandy flats with coastal fynbos vegetation in the Brandfontein area, near Bredasdorp.

Caulipsolon Klak 2405200

(Mesembryanthemoideae).
Klak & Linder: 301 (1998); Smith *et al.*: 36 (1998).

Perennials with prostrate annual stems and tuberous rootstock; stems weakly lignified, articulate, green and succulent, smooth. **Leaves** decussate, free towards bases, semicylindrical, ephemeral, smooth. **Flowers** solitary or in few-flowered dichasia, several per axis, single on shorter side branches, 20–30 mm diameter. **Sepals** 5. **Petals** white, decreasing in length towards center of flower. **Staminodes** 0. **Nectary** consisting of 5 separate grooves. **Ovary**: placentas axile. **Fruit** a 5-locular capsule of Mesembryanthemum type, base funnel-shaped, to 10 mm deep; expanding keels extending to centre of fruit; valve wings reflexed and fused in pairs. **Seeds** D-shaped, 1–1.3 mm long, surface rough, ochre.

Flowering late winter to early spring.

Distinguishing characters: tuberous rootstock; creeping annual stems; stems and leaves smooth; fruit funnel-shaped in lower part.

Species 1: *Caulipsolon rapaceum* (Jacq.) Klak is found in Namaqualand (Northern Cape).

Cephalophyllum N.E.Br. 2405024

(Ruschioideae: 11. Leipoldtia Group).
Brown: 433 (1925); Friedrich: 20 (1970); Herre: 108 (1971); Hartmann: 264 (1978); Hartmann: 653 (1983d); Hartmann: 141 (1984b); Hartmann: 263 (1986); Hartmann: 93 (1988b); Smith *et al.*: 256 (1998).

Prostrate perennials, sometimes compact, rarely erect and shrubby, with a prominent, vegetative, monopodial head in several species; main stem short, producing decumbent or prostrate branches, with distinct internodes between some leaf pairs. **Leaves** opposite, not connate, crowded at end of stem and branches, apically triangular in cross section, basally rounded, rarely quilt-shaped, club-shaped or triquetrous, often mucronate; stomata not sunken. **Flowers** 1–3, rarely solitary, terminal, up to 50 mm in diameter, on elongate, bibracteate or ebracteate pedicels; opening midday or afternoon. **Sepals** 5. **Petals** free, linear, yellow, purple or white in various combinations. **Stamens** erect, often differing in colour from petals. **Nectary** a crenulate ring. **Ovary** with top raised into a crater-like rim surrounding stigmas or sometimes simply depressed in centre; placentas basal; stigmas 10–21, plumose. **Fruit** a 10–21-locular capsule, of Leipoldtia type; with a prominent closing bulge formed by roof of locule; valve wings well developed; expanding keels parallel; covering membranes present; closing bodies large; sometimes as tumble fruit. **Seeds** ovoid or pear-shaped, small, brown. $x = 9$ (polyploidy).

Flowering in winter.

Distinguishing characters: cushion-forming perennials, creeping or erect; flowers often brilliantly multicoloured; fruit 10–20-locular with large closing bodies, broad valve wings and covering membranes with large closing bulges distally.

Species 33, in a broad band from Lüderitz to Aus in Namibia, stretching southwards through the Northern Cape and into the Western Cape, occasionally reaching the sea, and extending as far east as Oudtshoorn.

Cerochlamys N.E.Br. 2405025

(Ruschioideae: 8. Bergeranthus Group).
Brown: 171 (1928a); Herre: 110 (1971); Hartmann: 44 (1998); Smith *et al.*: 138 (1998).

Compact tufted perennials. **Leaves** opposite, shortly united at base, 1–3 pairs on a branch, trigonously clavate with rounded keels, often twisted almost at right angles from base, firm in texture with waxy covering, ± 40 mm long, purplish green to yellowish. **Flowers** terminal, 1–3; pedicel bracteolate; opening in late morning, open all day, long-lasting. **Sepals** 5 or 6, nearly equal. **Petals** 2- or 3-seriate, free, linear, pink with white bases, or white. **Stamens**: filaments epapillate; anthers yellow or orange. **Staminodes** present. **Nectary** appearing annular, of 5 separate crenulate glands, touching each other. **Ovary** obconic, flattish on top; placentas parietal; stigmas 5 or 6, short, acute. **Fruit** a 5- or 6-locular capsule; persisting on the plant; shortly obconic to nearly flat, with raised sutures on top; possibly close to Mitrophyllum type because of its widely diverging, broad expanding keels ending in awns, but valve wings absent; valves with high rims, only opening into a vertical position; spongy tissue separating locules; covering membranes stiff, acute, with dense mass of funicles at openings of locules. **Seeds** acutely ovoid, microscopically tuberculate. $x = 9$.

Flowering in autumn and winter.

Distinguishing characters: small tufted perennials flowering in mid-winter; leaves purplish green with a partially peeling waxy covering; capsule valves open to vertical position only.

Species 3. In crevices of rocks or in shaly places in the Little and Great Karoo, Western Cape.

Chasmatophyllum Dinter & Schwantes 2405026

(Ruschioideae: 5. Stomatium Group).

Schwantes: 14, 17 (1927d); Friedrich: 23 (1970); Herre: 112 (1971); Smith *et al.*: 182 (1998).

Dwarf shrublets, tufted or producing prostrate branches, often forming small mats. **Leaves** opposite, sheathing at base, 6–8 on branchlets, often oblong or spatulate, obtusely keeled, often obtusely toothed on margins and keel, surface somewhat warty and rough. **Flowers** solitary, terminal, pedicellate, ebracteate, 20–50 mm in diameter; open from late afternoon to early evening. **Sepals** 5, unequal, 3-angled. **Petals** 2- or 3-seriate, lanceolate, golden yellow, with reddish tips. **Stamens** many, converging. **Nectary** of 5 separate, somewhat crenulate glands, distinct. **Ovary**: top flat or nearly so; placentas parietal; stigmas 5, filiform. **Fruit** a 5-locular capsule, of Drosanthemum type; with broad valve wings; covering membranes present. **Seeds** obtusely hooked, somewhat rough, small, light yellow.

Flowering in summer.

Distinguishing characters: small, compact, creeping perennials; leaves with soft whitish teeth; flowers yellow.

Species 6, a wide, but sparse distribution in the sthn Afr. interior, stretching from the Karas Mountains in Namibia in the west, scattered in the Great and Little Karoos, Eastern Cape, North-West and Gauteng to Mpumalanga.

Cheiridopsis N.E.Br. 2405027

(Ruschioideae: 11. Leipoldtia Group).

Brown: 433 (1925); Brown: 406 (1926b); Friedrich: 24 (1970); Herre: 114 (1971); Hartmann & Dehn: 567 (1987); Hammer: 75 (1993a); Hammer: 59 (1995g); Smith *et al.*: 206 (1998).

Compact, tufted, dwarf to somewhat shrubby perennials; isophyllous or heterophyllous, rarely with a compact storage root. **Leaves** opposite, 1 or 2 pairs to a branch, up to 3 pairs in cultivation variably united, withering, leaf sheath of one pair developing into a prominent, papery, dry sleeve, short or long, triangular, rarely flattened or hood-shaped, green to glaucous-green, often with 1 or 2 small teeth along keel or near apex; epidermis papillate, covered with waxy compound, surface ± velvety, sometimes with prominent elevations above subhypodermal tannin idioblast layer. **Flowers** solitary, terminal, mostly pedicellate, with bracts, 10–100 mm in diameter; opening around midday and closing by sunset; scented. **Sepals** 4 or 5. **Petals** in several series, free, various shades of yellow, rarely purple or red. **Stamens** many; staminodes 0. **Nectary** a crenulate ring. **Ovary**: top raised at first, becoming depressed in fruit; placentas parietal to basal; stigmas 10–20, ± plumose. **Fruit** a 10–20-locular capsule, of Leipoldtia type with rather straight covering membranes and reduced additional closing devices; often with dorsal appendages (wings, tubes, flanges) on the covering membranes; with narrow, widely spreading or reflexed valves; diverging expanding keels with membranous, awn-like points; valve wings usually 0; closing bodies large. **Seeds** pear-shaped, obtusely 3-angled, smooth or rough, whitish to brownish. $x = 9$ (polyploidy).

Flowering from autumn to early spring.

Distinguishing characters: mostly tufted, variable perennials; leaf pairs closely pressed together, old leaves sometimes forming papery sheaths; flower stalk may be curved; fruit 10–20-locular, with awn-like points at ends of valves.

Species 33, in a broad band stretching from Lüderitz, in Namibia, southwards through the Richtersveld and Namaqualand in the Northern Cape, to the northern parts of the Western Cape. The largest concentration of species is in the vicinity of Steinkopf and Platbakkies.

Circandra N.E.Br. 2405138

(Ruschioideae: 9. Lampranthus Group).

Brown: 126 (1930a); Liede: 391 (1989); Smith *et al.*: 318 (1998).

Sparsely branched shrubs, up to 600 mm high, branching at base; stems smooth, up to 5 mm in diameter. **Leaves** slender, up to 35 mm long, free towards bases, acute, sharply 3-angled, smooth with serrated margins. **Flowers** terminal, solitary, pedicellate, bracteate, up to 50 mm in diameter. **Sepals** 5, unequal. **Petals** bright yellow. **Stamens** very short, broadening and connate at base; staminodes 0. **Nectary** unknown. **Ovary** 5-locular; placentas parietal. **Fruit** a 5-locular capsule, of Lampranthus type, to 12 mm in diameter; expanding keels diverging and extending into an awn with broad wings; covering membranes covering locules; closing bodies 0. **Seeds** large, up to 1.6 mm long, surface rough.

Flowering in early summer.

Distinguishing characters: shrub with distinctly curved branches; leaves serrated; flowers solitary, large and yellow.

Species 1: *Circandra serrata* (L.) N.E.Br., in a small area in the Western Cape and has been collected from the surroundings of Ceres, Tulbagh and Villiersdorp, at low altitudes of up to 500 m.

Cleretum N.E.Br. 2405140

(Ruschioideae: 2. Cleretum Group).

Brown: 412 (1925); Friedrich: 26 (1970); Ihlenfeldt & Struck: 411 (1986); Smith *et al.*: 66 (1998).

Micropterum Schwantes: 17 (1928a); Winkler: 20 (1957); Herre: 210 (1971).

Annual prostrate to erect herbs, with prominent, soft papillae. **Leaves** opposite, ± spatulate, entire or occasionally pinnatifid. **Flowers** solitary, terminal, pedicellate, ebracteate, small or large; opening during day, or cleistogamous. **Sepals** 5, papillate. **Petals** 1- to 3-seriate, few (± 20) and short (2–4 mm long) or many and long, yellow or white. **Stamens** relatively few; staminodes 6 to many. **Nectary** of 5 separate dark green glands. **Ovary** convex above with 5 prominent ridges; placentas parietal; stigmas 5(6), filiform to narrowly subulate. **Fruit** a 5(6)-locular capsule, close to Mitrophyllum type; upper part of capsule distinctly ridged; with large expanding sheets; expanding keels parallel, large; valve wings broad; covering membranes small or 0; closing bodies 0. **Seeds** obtusely triangular, compressed, minutely tuberculate or smooth.

Flowering from late winter to spring.

Distinguishing characters: annual herbs with flat leaves; flowers white or yellow, sometimes cleistogamous; upper surface of fruit ridged.

Species 3, western parts of South Africa, from the Cape Peninsula in the Western Cape, northwards through Namaqualand to the Richtersveld in the Northern Cape.

Conicosia N.E.Br. 2405028

(Ruschioideae: 1. Apatesia Group).

Brown: 433 (1925); Herre: 116 (1971); Hartmann: 52 (1993); Smith *et al.*: 68 (1998).

Herrea Schwantes: 436 (1927a); Herre: 170 (1971); Ihlenfeldt & Gerbaulet: 457 (1990).

Perennial or occasionally biennial herbs, usually with a short main stem ending in a tuft of leaves with mostly

prostrate flowering branches; often with a tuberous rootstock. **Leaves** opposite, sometimes alternate, slightly stem-clasping, triquetrous or ± terete, sometimes slightly concave on upper surface, up to 400 mm long, entirely without bladder cells; deciduous after fruiting. **Flowers** solitary, terminal, on long, ebracteate pedicels, variable in size, up to 130 mm in diameter, often with unpleasant smell; opening in afternoon and closing at sunset. **Sepals** 5, terete or subulate, from broad base. **Petals** free, in several series, linear, margins papillate, in various shades of yellow, rarely white above and salmon on lower surface. **Stamens**: many, filaments bearded at base; staminodes many. **Nectary** a low, weakly crenulate ring. **Ovary** concave or somewhat conical in centre above; placentas parietal or basal; ovules several per locule; stigmas 10–25, filiform. **Fruit** a 10–25-locular capsule, large, ± xerochastic—seed dispersal dependent on separation of valves by desiccation; with two parietal seed pockets per locule; without expanding keels; each valve with a pair of thin, submembranous, wing-like, locular partitions on inner face. **Seeds** subglobose, often slightly keeled, smooth. $x = 9$.

Flowering spring to early summer.

Distinguishing characters: perennial or biennial; leaves elongated; flowers yellow or whitish yellow; fruit distinctive, cone-shaped, 10–25-locular, without expanding keels, with seed pockets.

Species 2, western parts of South Africa (Western and Northern Cape) as well as S Namibia. *Conicosia pugioniformis* (L.) N.E.Br. subsp. *muirii* (N.E.Br.) Ihlenf. & Gerbaulet occurs in a distinct belt along the coastal regions as far east as Knysna. *C. pugioniformis* has been introduced to SE Australia and Victoria.

Conophytum N.E.Br. 2405030

(Ruschioideae: 7. Dracophilus Group)

Brown: 198 (1922a); Friedrich: 27 (1970); Herre: 120 (1971); Hammer: (1993b); Hammer: 23 (1995e); Hammer 34 (1995f); Smith *et al.*: 86 (1998).

Berrisfordia L.Bolus: 313 (1932); Herre: 92 (1971); Hartmann: 60 (1993). *Herreanthus* Schwantes: 514 (1928c); Herre: 172 (1971); Hartmann: 60 (1993). *Derenbergia* Schwantes: 137 (1925). *Ophthalmophyllum* (Dinter & Schwantes) Schwantes: 64 (1927b); Friedrich: 89 (1970); Herre: 238 (1971).

Dwarf, cushion-forming or single-bodied perennials, virtually stemless in early stages and with only fractional annual increments, internodes enclosed in young plants, moderately to profusely branched, rarely solitary bodies. **Leaves** of each pair usually united into obconic, cylindric or oblong bodies, with a small, mouth-like opening in centre or between lobes; turning into dry sheaths protecting subsequent year's growth during dry season; green to brown, reddish or whitish blue, spotted or lined, often velvety, warted or windowed. **Flowers** solitary, or in rare cases in delayed groups of two or three; with a prominent long perianth-stamen tube; emerging through opening in leaves sometimes appearing out of dry leaf sheath; bracts always present but concealed within leaves; usually scented; anthesis diurnal or nocturnal. **Petals** few to many in 1–several series, spreading or recurved; partially united and sometimes connected to sepal tube; magenta to blackish or coppery-red, yellow, orange, pink, white and often bicoloured, rarely scarlet. **Sepals** 4–6, united into a short, membranous tube above ovary, partly included or exserted from leaves. **Stamens** few to many, erect, included or partly exserted from corolla tube. **Nectary** a crenulate ring. **Ovary** flat or convex on top; usually hidden inside body; stigmas 3–8, plumose, basal parts usually fused into a style of varying length; placenta parietal to basal, very rarely axile. **Fruit** a 3–8-locular capsule, of Delosperma type; without covering membranes or closing bodies; very fragile, but often held together by leaves. **Seeds** ovoid, smooth or rough, minute. $x = 9$ (polyploidy).

Flowering mostly in autumn, few species flowering in other seasons.

Distinguishing characters: cushion-forming or single-bodied perennials; flowers with petals fused into a tube, pedicels with bracts.

Species 88, widely distributed over the winter-rainfall, semi-arid and arid regions, including the western parts of the Northern Cape notably Namaqualand, the Richtersveld and Bushmanland, the Western Cape including the Little Karoo and the southern margin of the Great Karoo. The genus just enters the western part of the Eastern Cape. More specifically the genus occurs northwards from Paarl to Alexander Bay and east to Pofadder, and in the south it ranges from Avondrust to Steytlerville. However, it is not found in parts of the Great Karoo which receive summer rain. The highest concentration of species is found in the Namaqualand region.

Corpuscularia Schwantes 2405130

(Ruschioideae: 4. Delosperma Group).

Schwantes: 186 (1926a); Dupont: 7 (1968); Smith *et al.*: 278 (1998).

Schonlandia L.Bolus: t. 259 (1927g).

Low shrublets, sometimes with trailing branches with internodes usually hidden by leaves. **Leaves** sharply triangular in cross section, sides ± parallel, with tiny pointed tips, smooth and firm in texture, very pale green to bluish green, unspotted. **Flowers** solitary, short-stalked, rather large and white to pale pinkish or cream; bracts leaf-like. **Sepals** 6, firm. **Petals** long and narrow, rather stiff, white. **Stamens** erect, sparsely hairy; staminodes few. **Nectary** of 6 separate, but nearly touching glands. **Ovary**: placentas parietal; stigmas 6. **Fruit** a 6-locular capsule, of Delosperma type; robust, whitish, with dark persistent petal remains, not closing completely after first opening; expanding keels parallel; valve wings broad; covering membranes 0; closing bodies 0. **Seeds** pear-shaped and nearly smooth. $x = 9$.

Flowering in spring and summer.

Distinguishing characters: shrublets with pale grey-green, triquetrous, dotless leaves; flowers white with stiff petals and 6 sepals; old petals persist on the developing fruit.

Species 2, restricted to the Eastern Cape, where it occurs from around Port Elizabeth up to Grahamstown.

Cylindrophyllum Schwantes 2405031

(Ruschioideae: 11. Leipoldtia Group)

Schwantes: 15, 28 (1927d); Herre: 122 (1971); Smith *et al.*: 210 (1998).

Tufted perennials up to 180 mm high, with short branches, often forming large cushions; stems woody with age, but internodes hidden, procumbent to ascending. **Leaves** opposite, connate at base, cylindric or terete, up to ± 100 mm long, 8 mm in diameter, grey-green, often reddish, finely dotted, fairly crowded, old leaves persistent; epidermis with elongate elevations of several cell rows, stomata in valleys, outer epidermal walls very thick and layered, thick waxy layer on epidermis. **Flowers** solitary, terminal, shortly pedicellate, ebracteate, ± 70 mm in diameter; opening at noon, closing by evening. **Sepals** 5, 3 larger than others and keeled. **Petals** short, in several series, whitish to yellow or pinkish, often with darker colours in centre. **Stamens** in several series, epapillate. **Staminodes** conically collected, orange or reddish. **Nectary** a crenulate ring.

Ovary fairly sharply conical on top; placentas parietal; stigmas 5–11, subulate, much shorter than stamens. **Fruit** a 5–11 locular capsule; of firm consistency, locules deep, and placenta parietal as in Ruschia type; with long, narrow, awn-like valve wings (not awn-like in *C. tugwelliae* L.Bolus); expanding keels toothed, parallel; covering membranes present; closing bodies small. **Seeds** orbicular, tessellate, dark brown. $x = 9$.

Flowering from spring to early summer.

Distinguishing characters: tufted perennials, with cylindrical leaves; flowers large, yellowish with many stamens; fruit with toothed parallel expanding keels and long, awn-like valve wings; placentation partially axile.

Species 6, mainly in the Little Karoo in the Western Cape. *Cylindrophyllum dyeri* L.Bolus has been recorded from Jansenville in the Eastern Cape and *C. hallii* L.Bolus on Brakfontein, near Loeriesfontein in the Northern Cape.

Dactylopsis N.E.Br. 2405032

(Mesembryanthemoideae)

Brown: 413 (1925); Herre: 124 (1971); Hartmann: 47 (1993); Gerbaulet: 145 (1997).

Phyllobolus N.E.Br. in part; Smith *et al.*: 42 (1998).

Compact, dwarf, highly succulent perennials forming clumps with age; roots thickened. **Leaves** alternate, 2 or 3 per branch, finger-like, cylindrical with long sheaths completely enveloping internodes, withering completely into a membranous covering protecting young buds. **Flowers** terminal, solitary, sessile, 10–20 mm in diameter, remaining continuously open for ± 3 weeks. **Sepals** 5, equal, forming a short tube above ovary. **Petals** white, stiff, numerous, in several series, merging into staminodes. **Stamens** numerous, linear, arising from rim of ovary and united into short tube; pollen punctate-foveolate, microspinulose. **Ovary** half-superior; placentas axile. **Nectary** of 5 separate grooves. **Fruit** a capsule, 5-locular, of Mesembryanthemum type; expanding keels parallel, diverging slightly distally; valves with membranous marginal wings or flaps. **Seeds** smooth, brown. $x = 9$.

Flowering from spring to early summer.

Distinguishing characters: compact, highly succulent perennials; leaves finger-like, cylindrical; flowers solitary, terminal, remaining open for ± 3 weeks.

Species 2, Vanrhynsdorp and Vredendal districts, Western Cape.

Deilanthe N.E.Br. 2405018

(Ruschioideae: 6. Titanopsis Group)

Brown: 137 (1931b); Hammer: 172 (1995d); Smith *et al.*: 160 (1998).

Aloinopsis Schwantes, in part.

Almost stemless tufted perennials with a thick and firmly fleshy rootstock, deeply rooting. **Leaves** opposite, united at base in sparse rosettes, spatulate-ovate or spatulate-lanceolate, flat on ground to erect, dark green to reddish brown and inconspicuously dotted, velvety. **Flowers** solitary or in delayed sets of three, pedicellate, bracteate at base of thick pedicel; opening in late afternoon or evening. **Sepals** 5, subequal. **Petals** in 3 or 4 series, free, linear to narrowly spatulate, pale to deep yellow or a greyish salmon colour sometimes obscurely striped with white. **Stamens** erect, in a loose cylindrical mass, papillate. **Nectary** glands large, in a crenulate ring. **Ovary** flattish or slightly convex on top, glassy; placentas basal to parietal; stigmas 8–12, erect, subulate. **Fruit** a 8–12-locular capsule, shortly obconic, flattish at top, with raised sutures; valves narrowly deltoid, with a very prominent, acute keel on inner face; expanding keels diverging from base, ± half as long as valve, each tipped with a pallid awn reaching nearly to tips of valves, and with short, broad, membranous marginal wings at base united in pairs between valves; covering membranes rather stiff, closing bodies small. **Seeds** pear-shaped, smooth.

Flowering from winter to early spring.

Distinguishing characters: rosette-forming perennials with tuberous roots; leaves spatulate-ovate or spatulate-lanceolate, velvety and often dust-covered; flowers deep yellow to salmon-coloured, opening in the afternoon.

Species 2, widespread in the Little and Great Karoos in the central Western Cape, extending slightly into the Northern and Eastern Cape. Species of *Deilanthe* grow from Anysberg in the southwest to Luckhoff in the northeast. A single species, *D. peersii* (L.Bolus) N.E.Br., occurs in the Free State.

Delosperma N.E.Br. emend. Lavis 2405033

(Ruschioideae: 4. Delosperma Group)

Brown: 412 (1925); Brown: 433 (1925); Lavis: 209 (1966); Friedrich: 34 (1970); Herre: 126 (1971); Smith *et al.*: 292 (1998).

Shrubs, shrublets or perennial herbs, often with annual branches, decumbent or prostrate, rarely scrambling; stems sometimes reddish, with peeling bark when older; rootstock sometimes tuberous and lower roots sometimes with multiple small tubers. **Leaves** opposite, sessile, slightly connate or free, sometimes hairy or prickly, usually with visible bladder cell idioblasts, variable in shape from broadly triangular to cylindrical, mostly semiterete with a concave upper side, rarely flat; from bluish green to yellowish green or reddish, usually soft. **Flowers** solitary or in 3-flowered dichasial inflorescences; pedicels variable in length; bracts small or foliaceous. **Sepals** 5, unequal, sometimes horn- or tail-like. **Petals** in 1–4 whorls, linear, obtuse or emarginate, rarely hairy, white to pink or purple, rarely yellow, salmon, orange, rust-red, scarlet, carmine or wine-coloured. **Stamens** erect; staminodes usually arranged in a cone, whitish, sometimes hairy. **Nectary** of 5 separate glands, rarely united into a ring. **Ovary** slightly convex or concave on top; placentas parietal; stigmas (4)5(6), subulate or caudate, papillate. **Fruit** a (4)5(6)-locular capsule of Delosperma type; expanding keels parallel; valve wings ± rectangular; covering membranes mostly 0; closing bodies 0. **Seeds** globose, pale brown, smooth to slightly textured. $x = 9$ (aneuploids, polyploidy).

Flowering spring to summer, or sporadically.

Distinguishing characters: creeping or shrubby perennials; leaves soft, glistening or hairy; fruit without covering membranes.

Species ± 163, mostly in South Africa where the genus is widespread in all the provinces except the climatically severe central Northern Cape. It also occurs in Lesotho, Swaziland, Botswana and further north to E Africa through Zimbabwe, Kenya and Tanzania to Ethiopia as well as Arabia and the Yemen. The Indian Ocean islands of Madagascar and Reunion also have a few indigenous species. A very heterogeneous genus in need of revision.

Dicrocaulon N.E.Br. 2405034

(Ruschioideae: 3. Mitrophyllum Group)

Brown: 141 (1928c); Herre: 128 (1971); Ihlenfeldt. Hartmann & Poppendieck: 171 (1978); Smith *et al.*: 234 (1998).

Woody shrublets, cushion-forming or up to 500 mm high, often with markedly different long shoots and dense shorter shoots with narrow rings left by scars of past leaf pairs. **Leaves** papillate, of two types: first type

of leaf pair united except for central aperture, small, forming a globose or elliptic body; second type arising from within aperture, oblong-terete, connate for half its length, base changing into a dry sheath. **Flowers** solitary, terminal, in position of a long leaf pair, i.e. base often enclosed by short leaf pair forming a cup; opening either in morning or at midday, remaining permanently open after a few days. **Sepals** 4 or 5, unequal. **Petals** free, filiform, vivid magenta or white, turning rosy pink. **Stamens** erect; staminodes present. **Nectary** a crested ring. **Ovary**: placentas parietal; stigmas (4)5(6–9), minute, subulate. **Fruit** a (4)5(6–9)-locular capsule, of Mitrophyllum type; flat with high rims on the valves; closing bodies 0; expanding sheets merging into prominent, contiguous expanding keels, with broad, membranous margins; covering membranes membranous. **Seeds** globose, light brown, shiny. $x = 9$ (polyploidy).

Flowering late winter to spring.

Distinguishing characters: shrublets with two different kinds of leaf pairs and woody, hard, thin stems; resting leaf bodies inconspicuous.

Species 7, Namaqualand, straddling the border between the Northern and Western Cape.

Didymaotus N.E.Br. 2405035

(Ruschioideae: Titanopsis Group)
Brown: 433 (1925); Herre: 130 (1971); Smith *et al.*: 94 (1998).

Compact, dwarf, highly succulent perennials, occurring as single leaf pairs and forming small clumps with age. **Leaves** opposite, young leaf pairs almost completely connate, forming obtusely rhomboid-ovoid, broadly keeled bodies, later splitting partly open to expose flattish upper leaf surfaces, one of the two leaves of a pair usually slightly larger than the other, usually as long as broad, roughly dotted, greyish green to reddish. **Flowers** 1 or 2 (in extreme cases up to 9), arising in axils of lower leaves (side shoots) which gradually shrink as 2 foliaceous bracts and upper leaves enlarge, ± 40 mm in diameter; opening around noon and closing by evening. **Sepals** 6, keeled, 2 larger than others. **Petals** in several series, free, whitish to purple, darkest in centre or occasionally at tips. **Stamens** papillate at base, with violet filaments; staminodes 0. **Nectary** a crenate, dark brownish green ring. **Ovary** convex above; placentas parietal; stigmas 6, subulate and somewhat plumose, shorter than stamens. **Fruit** a 6-locular capsule, of Drosanthemum type; covering membranes present; closing bodies 0. **Seeds** globose, yellowish brown. $x = 9$ (1 report).

Flowering in early summer.

Distinguishing characters: single-bodied or developing into small clumps; producing 2 flowers simultaneously, one on each side of the leaf pair; leaves keeled, waxy.

Species 1: *Didymaotus lapidiformis* (Marloth) N.E.Br., Tanqua Karoo in the Western Cape with predominantly winter-rainfall.

Dinteranthus Schwantes 2405036

(Ruschioideae: 6. Titanopsis Group)
Schwantes: 184 (1926b); Friedrich: 35 (1970); Herre: 132 (1971); Sauer: 9 (1975); Sauer: t. 1778 (1978); Smith *et al.*: 96 (1998).

Compact, dwarf perennials with leaf pairs forming ± spheroid bodies, stemless but with one to several branches, sometimes forming clumps with age. **Leaves** approximately 30 mm long, 20 mm wide, connate for a third to two-thirds of their length, separated by a shallow or deep fissure from which flowers arise; epidermis with variously sized indentations and horny ridges, or leaves smooth with scattered dark green or purple dots, greyish green. **Flowers** solitary, terminal, on short, stout, winged pedicel, appearing sessile, 30–50 mm in diameter, ebracteate; opening late in afternoon, closing by evening. **Sepals** (6)7(8), unequal, pubescent, some with membranous margins. **Petals** many, free or somewhat connate at base, spreading, light to dark yellow. **Stamens** papillate or glabrous near base, collected in a cone. **Nectary** a crenulate ring. **Ovary** convex or somewhat conical above; placentas parietal; stigmas 6–15, subulate, diverging, papillate or plumose. **Fruit** a 6–15-locular capsule, of Delosperma type; shortly and broadly obconic, flattish, with slightly raised sutures on top; valve wings well developed; expanding keels closely contiguous into a central keel; covering membranes reduced to a limb, narrow or 0; closing bodies 0. **Seeds** many in each locule, very small and finely rough, white or brownish. $x = 9$ (1 report).

Flowering from late summer to mid-winter.

Distinguishing characters: single-bodied or as small clumps; leaves often with distinct keel; pedicels short and stout; sepals 6–8.

Species 4, NW parts of the Northern Cape, and the southeastern parts of Namibia. Its distribution area is bounded by Prieska in the southeast, Sperlingspütz in the west and Karasberg in the north.

Diplosoma Schwantes 2405037

(Ruschioideae: 3. Mitrophyllum Group)
Schwantes: 179 (1926b); Herre: 134 (1971); Ihlenfeldt: 375 (1988); Smith *et al.*: 98 (1998).

Maughaniella L.Bolus: 264 (1961); Herre: 202 (1971). *Maughania* N.E.Br.: 389 (1931) not of J.St.Hil.

Compact, dwarf, highly succulent perennials forming clumps with age; with dry, dormant stage; each stem annually producing 2 opposite leaves, enclosed by brown to black sclerotic sheaths derived from leaf bases of previous year; root system short, fibrous. **Leaves** spreading horizontally to ± upright, shortly and obliquely united at base, soft and tender with hyaline dots, reddish in colour, ± 25 mm long, 5 mm broad, first leaf pair persistent, hidden inside previous year's sheaths, second pair only basally connate and short-lived; flowers breaking through connate base of last leaf pair. **Flowers** solitary or in 2s or 3s, terminal, sessile between leaf bases, ebracteate, ± 25 mm diameter; opening at noon, closing in evening. **Sepals** 5–7, unequal, roundish. **Petals** 2- or 3-seriate, linear, purple, basally white. **Stamens** with papillate bases, surrounded by staminodes (purplish black in *D. luckhoffii* (L.Bolus) Schwantes ex Ihlenf.). **Nectary** a dark green, slightly crenulate ring. **Ovary** flat or pear-shaped at top; placentas parietal; stigmas 5–7, filiform. **Fruit** a 5–7-locular capsule, of Mitrophyllum type; flat; without any closing devices; expanding keels broad, dark brown, ending either in an awn or a wing; covering membranes present; closing bodies 0. **Seeds** pear-shaped, small. $x = 9$ (1 report).

Flowering from winter to spring.

Distinguishing characters: compact dwarf plants forming clumps with age; leaves soft, often reddish, with large micro-windows; flowers sessile.

Species 2, confined to a few localities in the northwestern parts of the Western Cape.

Disphyma N.E.Br. 2405038

(Ruschioideae: ? 3. Mitrophyllum Group)
Brown: 433 (1925); Herre: 136 (1971); Chinnock: 331 (1971); Chinnock: 77 (1986); Chinnock: 59 (1996); Smith *et al.*: 260 (1998).

Prostrate perennials forming dense mats, rooting at nodes, with internodes 20–30 mm long. **Leaves** opposite, triquetrous, semiterete and sometimes minutely fringed at base, in small rosettes at nodes, hyaline-dotted seen against light, up to ± 30 mm long, bright green, later becoming reddish or yellowish. **Flowers** 1–3, terminal, rarely 2 or 3 in dichasia on tufted, short side branches; ± 40 mm in diameter; pedicels up to ± 30 mm long, ebracteate; opening at noon, closing by evening. **Sepals** 5, unequal, inner ones with membranous margins. **Petals** ± 2-seriate, linear, obtuse, free; white, pink to purple. **Stamens** with inner ones papillate at base; staminodes 0. **Nectary** a deeply crenulate ring. **Ovary** convex at top; placentas parietal; stigmas 5, subulate, plumose, up to ± 4 mm long. **Fruit** a 5-locular capsule, near Mitrophyllum type; pale yellow, spongy; valves becoming reflexed; closing bodies large, bifid, spongy, rarely 0; expanding keels diverging, with lacerate margins; valve wings ± oblong, as long as valves; covering membranes present. **Seeds** ± ovoid. $x = 9$ (polyploidy).

Flowering winter to early spring.

Distinguishing characters: mat-forming perennials; fruit spongy, closing bodies bilobed.

Species 4, South Africa, Australia, Tasmania and New Zealand; 2 in sthn Afr., coastal belt in the Western and Eastern Cape.

Dorotheanthus Schwantes 2405039

(Ruschioideae: 2. Cleretum Group)
Schwantes: 283 (1927c); Herre: 138 (1971); Ihlenfeldt & Struck: 411 (1986); Brusse: 89 (1996); Smith *et al.*: 70 (1998).

Pherelobus N.E.Br.: 400 (1928); Herre: 248 (1971). *Stigmatocarpum* L.Bolus: 326 (1927h). *Sinuoperculum* Van Jaarsv.: 5 (1982).

Annual, papillate herbs, procumbent to ascending, rarely compact; up to ± 100 mm high in flower. **Leaves** mostly alternate, first two whorls decussate, spatulate to oblong-ovoid to linear, flattish, in rosettes below and somewhat spaced above, not or only slightly connate at base, soft, narrowed into petiole-like base. **Flowers** solitary, terminal or axillary, up to 40 mm in diameter, on ebracteate pedicels up to 60 mm long; opening in morning and closing at night. **Sepals** 5, variable, sometimes foliaceous, softly papillate. **Petals** 2-seriate, free, linear-lanceolate or inconspicuous in *D. apetalus*; in many different colours ranging from white, yellow and orange to various shades of red, pink and purple; usually lighter towards base, resulting in a halo effect, centre mostly darker. **Stamens** brown or reddish, sometimes hairy at base; staminodes 0. **Nectary** a crenulate ring. **Ovary** flattish, without ribs or tubercles; placentas parietal; stigmas 5, subulate, papillate on inside. **Fruit** a 5-locular capsule, of Mitrophyllum type; with persistent stigmas; expanding sheets large; expanding keels diverging; valve wings narrow, acute; covering membranes present or 0. **Seeds** pear-shaped to globose, smooth and whitish or verrucose and dark brown. $x = 9$.

Flowering late winter to spring in habitat.

Distinguishing characters: annuals, with glistening bladder cell idioblasts; flowers multicoloured; fruit often with persistent stigmas.

Species 7, restricted to winter-rainfall region of South Africa. They are common along the coast and interior of Namaqualand in the Western and Northern Cape.

Dracophilus (Schwantes) Dinter & Schwantes 2405040

(Ruschioideae: 7. Dracophilus Group)
Schwantes: 187 (1927c); Walgate: 171 (1939); Herre: 140 (1971); Smith *et al.*: 140 (1998).

Juttadinteria subgen. *Dracophilus* Schwantes: 183 (1926).

Compact, dwarf perennials forming dense, low clumps, up to ± 300 mm high. **Leaves** opposite, trigonous, united at bases, ± 50 mm long and 15 mm broad, flattish above, grey to blue-green, rarely dentate on keel and margins; epidermis with rounded papillae of different sizes, largest ones over subhypodermal tannin idioblasts. **Flowers** terminal, solitary, ± 30 mm in diameter, on bibracteate pedicels ± 25 mm long; opening late in afternoon well into night, honey-scented. **Sepals** 5, nearly equal, obtuse. **Petals** 2- or 3-seriate, free, nearly as long as sepals, with reflexed tips, white to pink. **Stamens** collected in a central cone; filaments hairy at base. **Nectary** a crenulate ring. **Ovary** depressed, with raised centre; nectar glands annular, crenulate; placentas parietal; stigmas 8–11(14), subulate, semipersistent, recurved. **Fruit** a 8–11(14)-locular capsule, of Titanopsis type; closing bodies absent; valve wings present, large; expanding keels parallel, lacerate, ending in an awn; covering membranes present, covering two-thirds of locule, flattish, translucent. **Seeds** pear-shaped, greyish brown.

Flowering all year round.

Distinguishing characters: perennials with smooth or slightly toothed, finely textured, grey-green leaves; sepals 5 (*Juttadinteria* has 4); pedicels bracteate; flowers opening in the evening; fruit with covering membranes.

Species 4, arid areas from Lüderitz in SW Namibia, southwards to the northern part of the Richtersveld in the Northern Cape. Closely related with *Juttadinteria* and sometimes united with it (e.g. Friedrich: 58 (1970)).

Drosanthemum Schwantes 2405041

(Ruschioideae: 4. Delosperma Group)
Schwantes: 14, 29 (1927d); Friedrich: 37 (1970); Herre: 142 (1971); Smith *et al.*: 300 (1998).

Shrublets or loosely branched woody shrubs up to 800 mm high, erect, decumbent, or prostrate, with distinct internodes; stems maroon to ochre, with or without short to long hairs (bladder cells). **Leaves** decussate, sometimes trigonous or triquetrous, up to ± 50 mm long, 4 mm in diameter, free, bases rarely fused, with a rounded tip; mostly short-lived, easily dropped but rarely all leaves shed during dry season; with glistening papillae or bladder cells which are sometimes xeromorphic. **Flowers** solitary or in dichasia branched to various degrees, mostly pedicellate, on short, lateral branchlets, up to ± 30 mm in diameter; opening around midday, closing by evening. **Sepals** 5 or 6. **Petals** 1- or 2-seriate white, yellow, orange, scarlet or purple. **Stamens** standing in a central cone; staminodes, if present, white, pink or deep black, black staminodes associated with yellow or red flowers; when staminodes absent, stamens widely spreading. **Nectary** in several crenulate parts. **Ovary** flat or somewhat convex on top; placentas parietal; stigmas 4–6, filiform to lanceolate, or plumose, rarely 3-angled. **Fruit** a 5(6)-locular capsule, of Drosanthemum type; sometimes with seed-pockets; valve wings present; expanding keels contiguous, parallel or divergent; covering membranes present; closing bodies very small or 0; capsule often turning from light grey to blackish when wet. **Seeds** small, rough, with ribs and tubercles. $x = 9$.

Flowering mostly in spring and summer.

Distinguishing characters: creeping or shrubby perennials with visible bladder cell idioblasts on the leaves; fruit with valve wings and covering membranes.

Species ± 120, mainly southwestern parts of sthn Afr., including S Namibia and western, southern and central South Africa.

Eberlanzia Schwantes 2405042

(Ruschioideae: 12. Eberlanzia Group)

Schwantes: 189 (1926b); Friedrich: 42 (1970); Herre: 144 (1971); Hartmann & Stüber: 1 (1993); Hartmann: 29 (1996b); Smith *et al.*: 350 (1998); Hartmann: 44 (1998c).

Shrubs up to 500 mm high, sometimes thorny, erect to procumbent; internodes whitish. **Leaves** of a pair slightly connate, short and fat with convex sides, mucronate, greyish green to dark green; epidermis with elevations above subhypodermal tannin idioblasts, papillate. **Flowers** relatively small, ± 10–20 mm in diameter, in richly to poorly branched dichasia, with additional lateral inflorescences, sometimes umbellate and crowded, rarely solitary; spines in inflorescences irregularly distributed, derived from pedicels having lost the fruit; with 2 leafy bracts, with or without bracteoles. **Sepals** 5, nearly equal. **Petals** in 1 series or 0, white to violet. **Stamens** and **staminodes** present, collected in a cone, often papillate. **Nectary** a crenulate ring. **Ovary** raised on top; placentas parietal; stigmas 5, subulate, erect. **Fruit** capsule close to the Ruschia type; 5-locular; bottom bell-shaped, top convex, valve rims high; valves opening completely, valve wings broad and rectangular; closing bodies white; covering membranes complete with distal closing rodlets and low rims. **Seeds** smooth, almost round, amber-coloured. $x = 9$ (1 report).

Flowering throughout the year, peaking in winter.

Distinguishing characters: flat-growing to erect shrubs; leaves greyish green or reddish or bluish, textured; fruit with valves folding back entirely when expanded.

Species 8, mainly on sandy flats with limestone pebbles characteristic of the southern Namib Desert, Namibia, also in western Namaqualand, Northern Cape.

Ebracteola Dinter & Schwantes 2405043

(Ruschioideae: 10. Ruschia Group)

Schwantes: 15, 24 (1927d); Friedrich: 44 (1970); Herre: 146 (1971); Glen: 203 (1986); Hartmann: 29 (1996b); Smith *et al.*: 212 (1998).

Compact, tufted, dwarf, much-branched perennials with thickened roots. **Leaves** opposite, connate at base, trigonous to triquetrous, narrowing towards the apiculate apex, 30–40 mm long, 10 mm wide, light greyish green to blue-green becoming tinged with red in sunlight, often with dense, black or green dots, surface ± smooth; stomata only slightly sunken. **Flowers** 1(–3), terminal, shortly pedicellate, pedicels seemingly without bracts but bracts borne low down and difficult to see when whithered; up to ± 25 mm in diameter; opening late morning, closing evening. **Sepals** 5, free. **Petals** ± 1-seriate, purple to light purple with colour more intense at tips, or pure white. **Stamens** with linear filaments; staminodes surrounding stamens in a central cone. **Nectary** a crenulate ring. **Ovary** with placentas parietal; stigmas 5, subulate, ± plumose. **Fruit** a 5-locular capsule, persisting for many years on plants; broad expanding keels and broad valve wings indicate a relation to Titanopsis type of fruit, but deep locules and hook-shaped closing bodies agree with Ruschia type; valve wings narrow; expanding keels broad, sheet-like, toothed; covering membranes stiff; closing bodies small, often crenulate as in *Hereroa*. **Seeds** subglobose, smooth, whitish.

Flowering spring and summer (*E. wilmaniae* (L.Bolus) Glen) or throughout the year.

Distinguishing characters: tufted perennials with thickened rootstock; leaves bluish green; flowers purple fading to pink or white towards centre, or white.

Species 4, horseshoe-shaped distribution in sthn Afr., extending from central Namibia through the Northern Cape to central South Africa. Recent fieldwork has extended the distribution into the North-West, Free State and Gauteng.

Ectotropis N.E.Br. 2405044

(Ruschioideae: 4. Delosperma Group)

Brown: 12 (1927a); Bolus: 99 (1927e); Hammer 96 (1997); Smith *et al.*: 306 (1998).

Small tufted perennials, scarcely more than 15 mm high, 30 mm wide; with slender, prostrate, rooting branches; upper parts herbaceous, papillate, possibly annual; roots tuberous. **Leaves** semiterete or subtrigonous, upper surface flat, dorsally convex, ± 4 mm long, 1.5 mm in diameter; minutely textured and reddish in colour. **Flowers** solitary, ± 9 mm in diameter; pedicels ± 13 mm long. **Petals** few, white. **Stamens** ± 25, in one series erect; staminodes 0. **Ovary** partly superior, 5-celled; placentas parietal; stigmas 5, subulate. **Fruit** a 5-locular capsule, small and thin, extremely fragile; valve wings reduced; covering membranes and closing bodies 0. **Seeds** ellipsoid, smooth.

Flowering in summer.

Distinguishing characters: minute tufted perennials; leaves with visible bladder cell idioblasts; flowers solitary, white, without staminodes and with few petals.

Species 1: *Ectotropis alpina* N.E.Br., restricted distribution at Hogsback in the Amatola Mountains and the Katberg, Eastern Cape. A poorly known plant better placed in *Delosperma*.

Enarganthe N.E.Br. 2405045

(Ruschioideae: 9. Lampranthus Group)

Brown: 71, 151 (1930a); Herre: 148 (1971); Smith *et al.*: 320 (1998).

Shrubs up to 400 mm high, with smooth, woody branches and fibrous roots. **Leaves** opposite, not united, ± terete with a widened rounded apex, up to ± 35 mm long, 15 mm in diameter; epidermal cells with crystals in outer walls, stomata not sunken, wax cover ± smooth or with fine threads. **Flowers** solitary or occasionally with 2 lateral ones in addition, shortly pedicellate or subsessile, 60–70 mm in diameter; opening at noon. **Sepals** 4, unequal, 2 foliaceous, 2 with broad membranous margins. **Petals** many in ± 2 series, free, obtuse, bright magenta, sometimes with obscure stripe. **Stamens** 1-seriate; filaments papillate, magenta; staminodes 0. **Nectary** a crenulate ring. **Ovary** convex on top; placentas parietal; stigmas 8, short, subulate. **Fruit** a 8-locular capsule, of Lampranthus type but with narrow valve wings; fairly large and woody; expanding keels diverging; covering membranes present, small, not covering entire locule; closing bodies small (unusual in a Lampranthus type capsule). **Seeds** pear-shaped, brown to blackish brown.

Flowering in mid-winter.

Distinguishing characters: erect perennials with woody branches; flowers magenta; fruit 8-locular, with small closing bodies.

Species 1: *Enarganthe octonaria* (L.Bolus) N.E.Br., Richtersveld, between the Augrabies Mountain and Brakfontein in the Northern Cape.

Erepsia N.E.Br. 2405046

(Ruschioideae: 9. Lampranthus Group)

Brown: 433 (1925); Herre: 150 (1971); Liede: 391 (1989); Liede: 1 (1990), Hartmann: 44 (1998c); Smith *et al.*: 322 (1998).

Kensitia Fedde: 11 (1940); Herre: 186 (1971). *Piquetia* N.E.Br.: 433 (1925) not of H.Hallier (1921). *Semnanthe* N.E.Br.: 12 (1927a); Herre: 284 (1971).

Shrubs or shrublets, erect or decumbent, often branching from the base; stems smooth. **Leaves** acutely 3-angled, always with mucro, ± smooth, with a thin wax layer, often with hyaline dots. **Flowers** in many-flowered inflorescences, sometimes reduced to single flowers, sometimes almost sessile; often staying open day and night. **Sepals** 5. **Petals** free, ± linear but spoon-shaped in *E. pillansii* (Kensit) Liede, white, pink or puce. **Stamens** arising from inner surface or top of calyx tube, either partly or completely covered by staminodes. **Nectary** a series of small teeth in a continuous ring or rarely in groups of five. **Ovary** concave on top, forming an hypanthium with stamens bending down into it; placentas parietal; stigmas 5(9–13), very small, ± narrowly conical to almost globular. **Fruit** a capsule of ± Lampranthus type, usually 5-locular, rarely 9–13-locular, woody, base funnel-shaped; expanding keels ending in awns; valve wings variable; covering membranes with lateral-marginal closing ledges; closing bodies 0. **Seeds** large (0.9–1.6 mm long), dark brown, surface rough. $x = 9$ (1 report).

Flowering in summer.

Distinguishing characters: shrubs with sharp-tipped leaves; flowers with distinct hypanthium into which stamens bend.

Species 28, mainly found in the winter-rainfall area of the Western Cape, with an outlier around Port Elizabeth in the Eastern Cape.

Esterhuysenia L.Bolus 2405047

(Ruschioideae: 9. Lampranthus Group)

Bolus: 308 (1967); Herre: 152 (1971); Hartmann: 44 (1998c); Smith *et al.*: 280 (1998).

Low shrublets, 200–300 mm high, with smooth, reddish stems from which a reddish powder may flake off; roots fibrous. **Leaves** decussate, always equal and similar, ascending or spreading, lower side rounded, upper side flattened, apiculate, up to 12 mm long, minutely tuberculate, often tinged with red. **Flowers** terminal, solitary, up to 20 mm in diameter, pedicellate. **Sepals** 5. **Petals** magenta. **Stamens** papillate at base; staminodes 0. **Nectary** a crenulate ring. **Ovary** slightly convex on top; placentas parietal; stigmas 5. **Fruit** a 5-locular capsule, of ± Lampranthus type, obconical, woody; expanding keels parallel at base, divergent at points; valve wings very narrow, often absent in old capsules; covering membranes flexible, ± covering the locules; closing bodies 0. **Seeds** D-shaped, ± 1.2 mm long, brown, testa rough.

Flowering spring and summer.

Distinguishing characters: dwarf shrublets with reddish stems; leaves often red-tipped, fruit flat on top, valve wings very narrow, often absent in old capsules.

Species 4, in rocky places often on high mountain peaks near Caledon, Ceres, Robertson and Worcester in the winter-rainfall region of the Western Cape.

Faucaria Schwantes 2405049

(Ruschioideae: 5. Stomatium Group).

Schwantes: 176 (1926b); Bolus: 109 (1937/1938); Herre: 156 (1971); Smith *et al.*: 184 (1998); Groen & Van der Maesen: 35 (1999).

Dwarf, branched, rosette-forming perennials; short stems are often found with age but are generally obscured by clump-forming habit; roots slightly fleshy. **Leaves** opposite, 2–4 pairs per abbreviated branch, slightly connate at base, broadly triangular, varying from triangular in cross section to almost terete, up to 45 mm long, 20 mm broad, with distinct margins which are either smooth, white and cartilaginous or distinctly toothed, in some species teeth elongated and ending in a thin thread, surfaces smooth to variously tubercled or marbled and ribbed; dark green, reddish purple or rarely bluish. **Flowers** solitary, terminal, shortly pedicelled, sessile or subsessile, ebracteate, 30–50 mm in diameter; opening in afternoon, closing in evening. **Sepals** 5, unequal, often keeled and with membranous margins. **Petals** 2- or 3-seriate, free, linear, acuminate, obtuse or emarginate, often recurved, yellow to orange within, reddish copper outside and when withering, or rarely white. **Stamens** epapillate; staminodes 0. **Nectary** of 5 separate, crenate, yellow or greenish to dark brown glands. **Ovary** raised into a cone or subglobose on top; placentas axile to parietal; stigmas 5 or 6, filiform, erect. **Fruit** a 5- or 6-locular capsule, similar to Leipoldtia type but without closing bodies; appearing 10-locular and seedless: 5 empty hollows alternate with locules and seeds obscured by bent lamellae; valve wings firm, stout, connate with valves in their basal part only and standing rigidly above locules after opening of capsule; expanding keels ending in an awn, eventually capsules squeezed out by growth of new leaves. **Seeds** ± 1.5 mm long, reddish brown with minute, stalked protuberances. $x = 9$ (polyploidy).

Flowering late summer to autumn.

Distinguishing characters: compact perennial rosettes; leaves with distinct margins and rows of short to long teeth; flowers yellow, rarely white.

Species 6, components of the subtropical thickets of the Eastern Cape, in the western parts of the distribution range the genus extends into the Little and Great Karoo of the Western Cape.

Fenestraria N.E.Br. 2405050

(Ruschioideae: 11. Leipoldtia Group).

Brown: 433 (1925); Friedrich: 46 (1970); Herre: 158 (1971); Hartmann: 145 (1982a); Smith *et al.*: 100 (1998).

Dwarf, succulent perennials, forming clumps or mats, mostly subterranean, with leaf tips protruding above ground; stems and roots fleshy. **Leaves** few on each stem or branch, clavate, apically windowed; epidermis smooth, crystal sand present in guard cells of stomatal apparatus. **Flowers** 1(–3), pedicel long; ± 80 mm in diameter; opening at midday, closing late afternoon. **Sepals** 5, with membranous margins. **Petals** in 1 to several whorls, free, linear, yellow or white. **Stamens** many, with or without basal papillae; staminodes 0. **Nectary** a crenulate ring. **Ovary** half-inferior; placentas parietal; stigmas 8–16, spreading, plumose. **Fruit** a 8–16-locular capsule of Leipoldtia type, but with small closing bodies; becoming detached from plant and acting as tumble fruit; expanding keels parallel, diverging at tips, with teeth; valve wings small, with diverging tips; axile column firm; covering membranes well developed. **Seeds** somewhat conical, whitish, with brown tip. $x = 9$ (1 report).

Flowering from mid-winter to spring.

Distinguishing characters: plants mostly underground with windowed tips visible; leaf surface smooth; capsule

multilocular; flowers yellow or white, without filamentous staminodes.

Species 1: *Fenestraria rhopalophylla* (Schltr. & Diels) N.E.Br., with 2 subspecies, surroundings of Lüderitz, southwards along the coast of Namibia into the Richtersveld (Northern Cape).

Frithia N.E.Br. 2405051

(Ruschioideae: ? 5. Stomatium Group).
Brown: 433 (1925); Herre: 160 (1971); Hammer: 199 (1989); Zimmermann: 7 (1996b); Smith *et al.*: 102 (1998); Burgoyne *et al.*: 1 (2000).

Dwarf, stemless perennials, forming mats, often sunken in the soil; rhizome and adventitious roots slightly thickened and fleshy. **Leaves** alternate, 5–7 on each stem or branch, growing up to ground level, tiny (length < 10 mm), terete, with a distinct, flat, windowed top; sides of leaves papillate. **Flowers** solitary, sessile or subsessile from among leaves, ± 25 mm in diameter, with a hypanthium. **Sepals** 5, resembling leaves, united into a short tube above ovary. **Petals** in several series, shortly connate at base, purple to white; opening mid-morning, open until mid-afternoon. **Stamens** ± 3-seriate, papillate; with an outer series of epapillate staminodes. **Nectary** of 5 separate crenulate glands. **Ovary** slightly conical above; placentas parietal; stigmas 5 or 6, short, stout, acute. **Fruit** a 5- or 6-locular capsule, of Delosperma type but without valve wings; valves only rising to a ± erect position, margins of valves recurved when open; expanding keels parallel, with small wings and diverging tips; very fragile, breaking up when wet, ripe or moistened or rolling as tumble fruit to disperse seeds. **Seeds** small, minutely tuberculate.

Flowering spring to summer.

Distinguishing characters: plants mostly underground with windowed tips visible; leaf surfaces with visible bladder cell idioblasts in rows; flowers with a series of filamentous staminodes; capsule 5- or 6-locular.

Species 2, summer-rainfall areas in the northeastern part of South Africa. It has been collected on the Magaliesberg range to the west of Gauteng in the North-West and is also known from the vicinity of Bronkhorstspruit and Witbank, straddling the boundary between Gauteng and Mpumalanga.

Gibbaeum Haw. 2405052

(Ruschioideae: 4. Delosperma Group).
Haworth: 104 (1821); Brown: 273 (1921); Brown: 129, 151 (1922a); Nel: (1953); Herre: 162 (1971); Frandsen: 14 (1998); Smith *et al.*: 104 (1998); Van Jaarsveld & Hammer: 14 (1998).

Imitaria N.E.Br.: 348 (1927c); Herre: 178 (1971); Hartmann: 56 (1993). *Rimaria* N.E.Br.: 413 (1925). *Mentocalyx* N.E.Br.: 251 (1927a). *Argeta* N.E.Br.: 113 (1927b).

Dwarf, succulent perennials forming small, dense clumps or mats, up to 200 mm high; usually with a short woody rootstock, occasionally with fleshy roots. **Leaves** often very unequal and variable in shape, connate to different degrees, forming ± spherical bodies or trigonous with an apical chin to digitiform; light to dark green, bluish green, reddish, metallic grey, whitish green or grey-white; epidermis minutely hairy or with long dense hairs, more rarely smooth; stomata, and in most cases, subsidiary cells, sunken. **Flowers** solitary, terminal, pedicellate, ebracteate, 20–80 mm in diameter; opening in afternoon and closing in evening. **Sepals** 6–9, unequal. **Petals** 1–3-seriate, linear, free, white, pink, or different shades of purple. **Stamens**: staminodes present or 0, often bearded at base. **Nectary** of 6(?–9) large, separate, crenulate glands. **Ovary** often somewhat conical; placentas parietal; stigmas 6–9, usually stout and subulate, plumose. **Fruit** a 6–9-locular capsule, of Drosanthemum type; convex or conical with prominent sutures; valves deltoid, spreading, reflexed when expanded; expanding keels parallel or diverging, rarely toothed, terminating in broad wings; covering membranes present; closing bodies 0. **Seeds** many in each locule, acutely ovoid, smooth. $x = 9$ (polyploidy).

Flowering from late winter to early summer.

Distinguishing characters: Dwarf perennials with subequal to unequal leaves united into bodies with an oblique fissure separating the leaves of a pair, often velvety; flowers purple or white.

Species 16, mostly found growing in the Little Karoo, Western Cape and adjacent areas, it only extends peripherally into the Northern Cape.

Glottiphyllum (Haw.) N.E.Br. 2405053

(Ruschioideae: ? 3. Mitrophyllum Group).
Brown: 311 (1921); Herre: 164 (1971); Hartmann & Gölling: 1 (1993); Smith *et al.*: 144 (1998).

Compact, dwarf perennials, sparsely branched, with short branches often adpressed to ground, rarely tufted, with mostly hidden internodes; anisophyllous. **Leaves** 4 or more to a stem, very fleshy, mostly distichously arranged, tongue-shaped or linear-lanceolate, often twisted; bladder cells often only along leaf edges, from several times as long as broad to only slightly longer than broad, those of each pair unequal and with apical portions often differing in shape, bright green or various shades of red or purple. **Flowers** apparently solitary, axillary, ebracteate, sessile or shortly pedicellate, up to ± 70 mm in diameter; opening in morning and staying open all day. **Sepals** 4. **Petals** free or slightly united at base, linear-cuneate, bright yellow, rarely white. **Stamens** with epapillate filaments. **Nectary** 0. **Ovary** half-inferior, convex or flattish on top; placentas parietal; stigmas 5–14, spreading to reflexed, plumose. **Fruit** a 5–14-locular capsule, superficially similar to Leipoldtia type; valve wings 0 or very narrow; differing in broad-based shape and spongy-corky consistency of large closing bodies and mostly incomplete differentiation between expanding keel and expanding sheet; therefore tentatively placed with Mitrophyllum type. **Seeds** relatively large and variable in texture. $x = 9$.

Flowering in spring or autumn.

Distinguishing characters: perennials with very succulent, mostly distichously arranged, tongue-shaped leaves; flowers large, sepals 4, petals yellow; fruit pale, multilocular with large closing bodies.

Species 17, southern parts of South Africa. They occur over much of the southern Cape interior, particularly the Little Karoo where it straddles the border between the Western and Eastern Cape. Outliers are found in the Tanqua Karoo and Great Karoo in the west and north, and further east in the Eastern Cape.

Hallianthus H.E.K.Hartmann 2405150

(Ruschioideae: 11. Leipoldtia Group).
Hartmann: 1 (1983c); Hartmann: 143, 167 (1983a); Smith *et al.*: 370 (1998).

Leipoldtia L.Bolus in part.

Procumbent shrubs with a compact centre of short shoots and 4–20 trailing floriferous shoots with long, thin internodes. **Leaves** opposite, scarcely fused at base, trigonous to falcate, dark green, often laterally compressed; stomata not sunken, crystal layer in outer epidermal wall reduced. **Flowers** 1–3, bracteate. **Sepals** 5. **Petals** white, pink or bicoloured. **Stamens** in a central cone encircled by many staminodes, brightly coloured apically. **Nectary** a crenulate ring. **Ovary** with parietal

placentas. **Fruit** a 10-locular capsule, of Leipoldtia type; turret-shaped with prominent subproximal elevations on covering membranes; expanding keels parallel; expanding sheets extensive.

Flowering autumn and winter.

Distinguishing characters: flat-growing perennials with long internodes; leaf pairs laterally flattened; fruit 10-locular, turret-shaped on top.

Species 1: *Hallianthus planus* (L.Bolus) H.E.K.Hartmann, Namaqualand in the Northern Cape and further south in the Western Cape in the Tanqua Karoo.

Hammeria Burgoyne 2405190

(Ruschioideae: ? 3. Mitrophyllum Group).
Burgoyne *et al.*: 203 (1998); Smith *et al.*: 188 (1998).

Small, prostrate shrublets up to 500 mm high; long shoots may spread from central stem, rooting at widely-spaced nodes. **Leaves** opposite, borne upright, basal leaves joined for up to a third of their lengths becoming membranous and persistent, forming sheaths around young leaves which form the next leaf pair, green leaf pairs 10 to 20 mm long, D-shaped in cross section and borne close together, margins toothed at tips; surfaces with a layer of flaking wax and dark green translucent dots, colour varying from grey-green in rainy season to buff in dry season. **Flowers** 1 or 2, borne upright on stalks up to 30 mm long, ± 20 mm in diameter, subtended by bracts resembling leaves; open from midday to mid-afternoon. **Sepals** 5, equal, recurved, sometimes with toothed tips. **Petals** in 2 or 3 whorls, pale pink with white at the centre. **Stamens** forming a central cone; staminodes short. **Nectary** a crenulate, dark green ring. **Ovary**: placentas parietal; stigmas 5, longer than stamens. **Fruit** a 5-locular capsule, close to Mitrophyllum type; covering membranes ample; valves winged; expanding keels diverging and expanding sheets conspicuous; closing bodies absent or present as small bulges. **Seeds** smooth, honey-coloured with darker tips.

Flowering in spring.

Distinguishing characters: small shrublets, branches prostrate, rooting at the nodes; leaves toothed at tips; capsule 5-locular, ± of the Mitrophyllum type.

Species 2, restricted to the Tanqua Karoo and the Ceres Karoo in the Western and Northern Cape.

Hartmanthus S.A.Hammer 2405189

(Ruschioideae: 7. Dracophilus Group).
Hammer: 77 (1995a); Smith *et al.*: 282 (1998).

Delosperma N.E.Br. emend. Lavis in part.

Compact, small to medium-sized shrublets, with erect or somewhat spreading, woody branches. **Leaves** greenish grey to silvery, strongly compressed lengthwise and keeled on back; leaf margins not very sharp, often with a reddish tinge in full sun; leaf surfaces rough to the touch. **Flowers** in long, flattened and long-lived inflorescences, faintly scented. **Sepals** 5, unequal. **Petals** almost white to light or distinctly pink. **Nectary** a crenulate ring, or of 5 separate, crenulate glands. **Ovary** with basal-parietal placentas. **Fruit** a 6-locular capsule, of Delosperma type; whitish; expanding keels parallel, yellowish; valve wings large; covering membranes 0; closing bodies 0. **Seeds** medium-sized, pear-shaped, rather glossy.

Flowering during late winter and early spring.

Distinguishing characters: compact shrublets; leaves greenish grey to silvery green, laterally flattened, sometimes rough, shrinking unevenly when dehydrated, leaf margins reddish purple; pedicel strongly flattened.

Species 2, in very arid regions in the northern Richtersveld, Northern Cape, and in the Sperrgebiet in S Namibia.

Hereroa (Schwantes) Dinter & Schwantes 2405055

(Ruschioideae: 8. Bergeranthus Group).
Schwantes: 23 (1927d); Friedrich: 55 (1970); Herre: 168 (1971); Smith *et al.*: 214 (1998).

Bolusanthemum Schwantes: 514 (1928c).

Dwarf, tufted perennials, or shrublets up to ± 200 mm high. **Leaves** opposite, connate at base, ± finger-like and narrowing to a blunt tip, sometimes compressed laterally in upper part, ± free, lower apical part forming a hood or chin or resembling a hatchet or narrowing to a blunt tip, bright to dark green, often greyish or purplish green; surface smooth, covered with dark dots which are raised when leaves are not fully swollen; stomata not or only a little sunken, central water tissue milky-white from many intercellular spaces. **Flowers** solitary to several in dichotomous cymes, pedicellate and bracteate, up to ± 40 mm in diameter; opening afternoon and evening; scented. **Sepals** 5, unequal, acuminate. **Petals** 2–4-seriate, yellow with reddish exterior, rarely white. **Stamens** often papillate at base. **Nectary** with glands separate or fused into a ring. **Ovary** often somewhat concave above; placentas parietal; stigmas 5, filiform, longer than stamens. **Fruit** a 5-locular capsule, close to Mitrophyllum type but closing bodies small, variable in shape; locules either deep or shallow and with a raised placenta; expanding keels diverging, without wings or membranous points, often narrow; covering membranes present, translucent. **Seeds** small, pear-shaped, with concave depression, light brown. $x = 9$.

Flowering mainly in summer.

Distinguishing characters: plants tufted, with tuberous roots; leaves dotted; flowers in cymes, on bracteate pedicels, petals yellow, flowers opening during the afternoon or evening.

Species 32, extensive yet discontinuous in sthn Afr., widespread in S Namibia and in South Africa where it is found in all the provinces except Mpumalanga and KwaZulu-Natal.

Hymenogyne Haw. 2405059

(Ruschioideae: 1. Apatesia Group).
Haworth: 192 (1821); Herre: 176 (1971); Ihlenfeldt & Gerbaulet: 457 (1990); Gerbaulet & Ihlenfeldt: 511 (1990); Smith *et al.*: 74 (1998).

Thyrasperma N.E.Br.: 412 (1925).

Annual herbs of tufted habit when young, later branching prostrately. **Leaves** opposite, radical or clustered at ends of prostrate or decumbent branches, flat, petiolate, sheathing at base, not connate; tannin idioblasts in epidermis (only case known in family), surface covered with wax flakes. **Flowers** mostly solitary, on elongate, erect pedicels becoming prostrate in fruit; opening in afternoon and closing at night. **Sepals** 5. **Petals** free or nearly so, ivory to yellow, fading to orange, epapillate. **Stamens** epapillate; staminodes 0. **Nectary** an inconspicuous, faintly crenulate ring. **Ovary** basin-shaped with a depressed top, with a mushroom-shaped structure in the centre, formed by connate stigmas, with 8–12 papilla-like stigmatic surfaces on top; placentas axile. **Fruit** a schizocarpic capsule, 8–12-locular; without opening devices but breaking up into flat, circular,

broadly winged, 1-seeded units (clausae); dispersal anemochoric. $x = 9$.

Flowering from spring to early summer.

Distinguishing characters: annual herbs with flat leaves; flowers solitary, petals ivory to yellow, fading to reddish with age, stigmas forming a central column; fruit schizocarpic.

Species 2, Western Cape, from the Cape Peninsula to Clanwilliam.

Ihlenfeldtia H.E.K.Hartmann 2405161

(Ruschioideae: 6. Titanopsis Group).
Hartmann: 47 (1992b); Smith *et al.*: 108 (1998).

Cheiridopsis N.E.Br. in part.

Compact, dwarf, clump-forming perennials developing few to many short branches, each with only 1 leaf pair in the dry season. **Leaves** opposite, leaf pairs connate towards base, distinctly keeled, 3-sided, upper surface ± triangular, sometimes with tiny, often reddish teeth along margins and keels, papillate. **Flowers** solitary, erect, bracteate, up to 70 mm in diameter; opening from midday until dusk. **Sepals** 5. **Petals** all shades of yellow to cream or pure white, often purplish suffused, particularly sides of petals, all colours may turn red with age. **Stamens** erect to connivent. **Nectary** a crenulate ring. **Ovary**: placentas parietal; stigmas 10–15, narrowly triangular. **Fruit** a 10–15-locular capsule, of Titanopsis type; with tiny endocarpal closing bodies; covering membranes thin, flexible, collapsing into empty seed chambers once seeds have been dispersed; valve wings taper from broad bases to tips. **Seeds** pear-shaped, smooth.

Flowering in winter.

Distinguishing characters: compact perennials with keeled leaves; flowers yellow, tinged with purple or red; fruit with robust stalks, closing bodies small or absent.

Species 2, Northern Cape, and prefer quartzitic soils in Bushmanland and the adjacent areas of Namaqualand.

Jacobsenia L.Bolus & Schwantes emend. Ihlenf. 2405061

(Ruschioideae: 3. Mitrophyllum Group).
Bolus & Schwantes, in Bolus: 255 (1954a); Bolus & Schwantes, in Schwantes: 69 (1954); Herre: 180 (1971); Ihlenfeldt: 109 (1997); Smith *et al.*: 142, 236 (1998).

Anisocalyx L.Bolus: 385 (1958b); Herre: 72 (1971); not of Hance ex Walp., 1852 (Scrophulariaceae). *Drosanthemopsis* Rauschert: 555 (1982).

Compact or densely tufted shrublets, 150 mm high; stems to 10 mm diameter; adult plants either with erect shoots with elongated internodes and distinct lateral short shoots with very short internodes, or with ± compact habit without clear distinction between long and short shoots. **Leaves** opposite, succulent, at least last leaf pair of season persisting on stem until next season; leaf pairs of a season isophyllous, leaves of a pair sometimes slightly anisophyllous, each stem usually developing 2 leaf pairs per season; leaf pairs basally connate for ± a fifth of their length, leaves erect or spreading, ± digitiform, often ± curved, upper surface sometimes flattened, lower surface sometimes somewhat keeled; the very base of the connate portion of a leaf pair developing into a narrow, ring-shaped, persisting, sclerotic sheath, usually brown-red; leaves to 70 mm long, 10 mm in diameter; epidermis with bladder cells. **Flowers** terminal, emerging towards end of season from connate portion of 2nd or sometimes 1st leaf pair, solitary, pedicellate; pedicels 10–70 mm long, up to ± 80 mm in diameter; opening in morning, closing in evening. **Sepals** (4)5 or 6(–8), 3 with membranous margins. **Petals** 4- or 5-seriate, acuminate, white to lemon yellow, or rarely purplish, inner petals shorter. **Stamens**: filaments white or yellow, papillate; pollen reticulate, spinulose; staminodes 0–very few. **Nectary** a finely crenulate, ± 5-angled ring. **Ovary**: placentas parietal; stigmas 5, subulate. **Fruit** a 5-locular capsule, of Mitrophyllum type; closing bodies 0; valve wings broad, recurved; expanding keels diverging, margins toothed, ending in awns; covering membranes covering a half to three-quarters of locule. **Seeds** globose, brown to light brown, testa minutely papillate. $x = 9$.

Flowering in spring to early summer.

Distinguishing characters: shrublets with long, erect branches bearing inflorescences; leaves of a pair forming plant bodies only in juvenile stage; flowers white, on long, red-brown, bare stems.

Species 3, southwestern Namaqualand in the vicinity of Vanrhynsdorp and Vredendal, Northern and Western Cape.

Jensenobotrya A.G.J.Herre 2405062

(Ruschioideae: 7. Dracophilus Group).
Herre: 79 (1951); Friedrich: 58 (1970); Herre: 17 (1970); Herre: 182 (1971); Giess: 3 (1974); Smith *et al.*: 264 (1998).

Shrubs, prostrate or often hanging, with thick woody stems forming large dense mats; branches covered with old, dry leaves; internodes 2 or 3 mm long. **Leaves** 4–6 on a branch, opposite, shaped like a grape, very fleshy, 12–15 mm in diameter, smooth, grey, often purplish suffused; epidermis cells flat, outer walls with a rather thick crystal layer. **Flowers** terminal, solitary, shortly pedunculate, up to ± 25 mm in diameter; all elements of androecium on a raised rim above nectary; opening at noon, closing by dusk. **Sepals** 5, unequal, 3 inner with membranous margins. **Petals** 2-seriate, free, acute, magenta with white at base. **Stamens** many, filaments pubescent at base; staminodes 0. **Nectary** a dark green, crenulate ring. **Ovary** flat or somewhat concave on top; placentas parietal; stigmas 5, subulate, with rudimentary stylodia. **Fruit** a 5(6)-locular capsule, of Delosperma type; flat, basin-shaped, up to 12 mm in diameter with septa prominent, erect, arched towards central column; expanding keel contiguous towards base, diverging and excurrent into very long, narrow, pennant-like white wings; covering membranes 0; closing bodies 0. **Seeds** oblong-ovate, ± 1 mm long, shiny, brown.

Flowering in autumn and winter.

Distinguishing characters: perennials with thick woody stems and leaves resembling grapes; highly localised in its distribution.

Species 1: *Jensenobotrya lossowiana* A.G.J.Herre, endemic to Namibia, and occurs at Dolphin Head in Spencer Bay, in the coastal desert between Lüderitz and Walvis Bay.

Jordaaniella H.E.K.Hartmann 2405145

(Ruschioideae: 11. Leipoldtia Group).
Hartmann: 57 (1983c); Hartmann: 1 (1983c); Hartmann: 321 (1984a); Smith *et al.*: 266 (1998).

Cephalophyllum N.E.Br. in part.

Prostrate perennials, with long orange-coloured or yellow internodes with a spongy persistent primary cortex; adventitious roots many, arising from nodes of trailing branches. **Leaves** fusiform, characteristically broadest towards middle and tapering towards both ends; stomata not sunken. **Flowers** solitary on short side branches,

bracteate; opening midday, closing in afternoon. **Sepals** (4)5(6). **Petals** in different shades of yellow or purple, rarely white. **Stamens**: inner filaments papillate at base, yellow, white or salmon-pink; staminodes 0. **Nectary** a weakly crenulate ring. **Ovary**: placentas parietal. **Fruit** a 10–25-locular capsule, of Leipoldtia type but with small closing bodies. $x = 9$.

Flowering in winter and spring.

Distinguishing characters: perennials with trailing stems; leaves tapering towards both ends; fruit 10–25-locular, with angular valves, appearing squarish on top.

Species 4, mainly on coastal sands in Strandveld and in the succulent Karoo, restricted to S Namibia, Northern and Western Cape.

Juttadinteria Schwantes 2405063

(Ruschioideae: 7. Dracophilus Group).
Schwantes: 182 (1926b); Walgate: 171 (1939); Friedrich: 58 (1970); Herre: 184 (1971); Smith *et al.*: 148 (1998).

Dwarf, tufted perennials, with short internodes, or erect, ascending, rarely procumbent dwarf shrubs. **Leaves** mostly short and fleshy, decussate, connate at base, ovoid, subcylindric, broadly boat-shaped or triangular, sometimes with reddish or brownish teeth on margins and keel, pale grey-green or blue-green; epidermis with rounded papillae of unequal size, smaller ones surrounding stomata, larger epidermal cells with anticlinal secondary walls, grey from a flaky wax layer. **Flowers** solitary, terminal, shortly pedicellate, ebracteate, ± 50 mm in diameter; often scented; opening in early afternoon, closing at night. **Sepals** 4, 2 outer ones often toothed, lanceolate, 2 shorter ones with membranous margins. **Petals** 1–3-seriate, free or somewhat connate at base, linear, reflexed, mostly white, light to dark violet-red, glistening on both sides. **Stamens** hairy at base, collected in a cone; staminodes 0. **Nectary** a crenulate ring. **Ovary** ± flat or slightly conical; placentas parietal; stigmas 8(–11), subulate, sometimes on short style. **Fruit** a 8(–11)-locular capsule, near Delosperma type; with central column and thick septa between locules; valve wings long, narrow; expanding keels parallel, diverging slightly near tips; covering membranes rarely well developed, mostly reduced to a limb; closing bodies 0. **Seeds** ± spherical or pear-shaped, wrinkled or warty.

Flowering in winter.

Distinguishing characters: branches erect to spreading; leaves tuberculate; flowers with 4 sepals, petals white, stigmas 8, opening in the morning; pedicels ebracteate; fruit with rudimentary covering membranes.

Species 10, confined to the northern Richtersveld in the Northern Cape and in Namibia it ranges from Lüderitz in the northwest to Aus in the northeast; it is common in the Sperrgebiet.

Khadia N.E.Br. 2405065

(Ruschioideae: 10. Ruschia Group).
Brown: 279 (1930b); Herre: 188 (1971); Chesselet & Hartmann: 46 (1995); Chesselet, Hartmann, Hahn, Burgoyne & Smith: 25 (1998); Smith *et al.*: 218 (1998); Winter & Hahn: 16 (1999).

Compact to mat-forming dwarf perennials; rootstock thickened or not, bearing ± horizontal branches with internodes mostly reduced and hidden or elongated up to 40 mm, with adventitious roots at nodes; ± anisophyllous. **Leaves** opposite, with 2 (3, in cultivation up to 4) new leaf pairs per branch, per season; connate at base, triquetrous distally with acuminate tips, semiterete basally and broader than thick, dark green or glaucous; subepidermal enlarged tanniniferous cells (pellucid dots) concentrated along keel and margins. **Flowers** solitary, pedicellate; opening in sunlight or in afternoon (*C. carolinensis*). **Sepals** 5 or 6. **Petals** in 2–4 series, white to deep magenta, with shades of pink. **Stamens**: filaments variable in colour and length; staminodes white to purple, forming a distinct cone in newly opened flowers, spreading and bending backwards in time. **Nectary**: glands forming a dark green crenate ring. **Ovary** with upper surface convex or centrally depressed; placentas parietal; stigmas (4)5–11, sometimes longer than filaments. **Fruit** a (4)5–11-locular capsule, reddish when young, dark brown later; pedicel persistent or breaking off, resulting in a tumble fruit; valves without wings but with enlarged rims; bases of expanding keels widely separated; covering membranes complete, rather firm, filled ± with a whitish spongy tissue, with low rims at distal ends; closing device at distal rim of capsule reduced to a tiny bud or knob formed by placenta or by an outgrowth of expanding sheet over some protrusion from endocarp. **Seeds** ± 1 mm long; micropylar end curved and elongated or short and straight.

Flowering in summer.

Distinguishing characters: perennials tufted with tuberous roots, often trailing and rooting at the nodes; flowers solitary.

Species 6, North-West, Gauteng and Mpumalanga, extending into N KwaZulu-Natal.

Lampranthus N.E.Br. 2405066

(Ruschioideae: 9. Lampranthus Group).
Brown: 71 (1930a); Friedrich: 64 (1970); Herre: 190 (1971); Hartmann: 44 (1998c); Smith *et al.*: 326 (1998).

Prostrate, decumbent or erect shrublets or shrubs; stems smooth, occasionally rooting at nodes; roots fibrous, rarely thickened. **Leaves** decussate, shortly fused towards base or free, always equal and similar, terete, semiterete or 3-angled, blunt or tapering, occasionally dotted, up to 50 mm long; epidermis smooth or scabrid. **Flowers** terminal or axillary, in dichasia or solitary, mostly pedicellate, rarely sessile; 7–70 mm in diameter. **Sepals** 5. **Petals** white, yellow, orange, red or purple. **Staminodes** 0 or present, conically collected or spreading. **Nectary** a low, crested ring. **Ovary** with placentas parietal; stigmas 5(–7), ± triangular. **Fruit** a capsule of Lampranthus type, usually 5-locular, woody, base funnel-shaped, occasionally with seed pockets; valve wings large, or rarely absent; expanding keels diverging; covering membranes stout; closing bodies absent but sterile funicles blocking exits of locules. **Seeds** D- or pear-shaped, 0.8–2.0 mm long, brown to black, surface rough or smooth.

Flowering mostly in spring and early summer but throughout the year.

Distinguishing characters: creeping to erect shrubs or shrublets; leaves smooth, cylindrical; fruit with funicular hairs at distal exits of locules, covering membranes and valve wings present.

Species ± 220 described, the majority found in a broad band along the western and southern coasts of the Northern, Western and Eastern Cape. Further towards the east it grows near the Mthamvuna River mouth on the border between the Eastern Cape and KwaZulu-Natal, also extends as far north as S Namibia.

Lapidaria (Dinter & Schwantes) N.E.Br. 2405067

(Ruschioideae: 6. Titanopsis Group).
Brown: 472, 492 (1928e); Friedrich: 66 (1970); Herre: 192 (1971); Smith *et al.*: 110 (1998).

Compact, ± stemless, dwarf, succulent perennials with 1–4 leaf pairs per main branch. **Leaves** in a rosette,

short, trigonous, lower part produced like a chin, keel and edges obvious but not sharp, pale pinkish brown or whitish in colour; surface with a minutely rough texture; epidermal cells somewhat elevated, stomata and subsidiary cells sunken, outer epidermal wall with a thick crystal layer. **Flowers** solitary or up to 3 in succession, terminal, ± 50 mm in diameter; borne on short, winged stalks; open during day. **Sepals** 6–8, ± equal. **Petals** 3-seriate, slightly connate at base, golden yellow. **Stamens** with filaments papillate at base; staminodes present. **Nectary** a low crenulate ring. **Ovary** flattish on top; placentas parietal; stigmas 6–8, subulate, recurving. **Fruit** a 6–8-locular capsule, of Titanopsis type, flat with raised sutures; valves widely spreading or recurved when expanded; expanding keels contiguous towards base, diverging towards apex with broad, membranous margins; covering membranes present; closing bodies 0. **Seeds** small, pear-shaped, light brown. $x = 9$.

Flowering in winter.

Distinguishing characters: compact, stemless perennials with keeled leaves, often appearing somewhat shrunken; flowers yellow; pedicels winged.

Species 1: *Lapidaria margaretae* (Schwantes) Dinter & Schwantes, Warmbad area of S Namibia and in adjacent parts of the Northern Cape.

Leipoldtia L.Bolus 2405068

(Ruschioideae: 11. Leipoldtia Group).

Bolus: 256 (1927d); Friedrich: 67 (1970); Herre: 194 (1971); Hartmann: 1 (1983c); Hartmann & Stüber: 1 (1993); Hartmann & Rust: 275 (1994); Hartmann & Stüber: 353 (1994); Smith *et al.*: 372 (1998).

Rhopalocyclus Schwantes: 599 (1928c).

Straggling or dense shrubs up to 1 m high, rarely procumbent or creeping, rarely with spines derived from pedicels, sometimes with branches rooting some distance from mother plant. **Leaves** opposite, trigonous, rarely crescent-shaped and compressed, borne upright, greyish, with smooth surfaces; epidermal cells flat to somewhat elevated, stomata a little sunken. **Flowers** mostly in many-flowered dichasia, rarely solitary, ± 25 mm in diameter; pedicel constricted under calyx, bracteate below middle, persisting and sometimes spinescent; open in day-time. **Sepals** 5(6), subequal, with membranous margins. **Petals** 1- or 2-seriate, linear-spatulate, obtuse, purple or pink, rarely white or yellow. **Stamens** with filaments of inner stamens papillate; staminodes spreading, conically collected or absent. **Nectary** a crenate ring. **Ovary** slightly convex on top; placentas parietal; stigmas 10(–16), subulate-acuminate. **Fruit** a 10(–16)-locular capsule, of Leipoldtia type; covering membranes wavy with closing rodlets at distal end; expanding keels radially spreading, contiguous towards base; valve wings broad; closing bodies large and white. **Seeds** ± smooth, pear-shaped, ochre to light brown. $x = 9$.

Flowering mainly in winter.

Distinguishing characters: sparse shrubs; fruit 10(–16)-locular; whitish grey when closed.

Species 11, extends from near Aus, Namibia, down into South Africa to the region of Worcester, into the Little Karoo in the Western Cape, and eastwards to the Eastern Cape. Most species occur in the vicinity of the Richtersveld (Northern Cape).

Lithops N.E.Br. 2405069

(Ruschioideae: 6. Titanopsis Group).

Brown: 44 (1922a); Friedrich: 68 (1970); Herre: 196 (1971); Cole (1988); Clark: 1 (1996); Smith *et al.*: 112 (1998).

Compact, ± stemless, dwarf, succulent perennials, ± sunken in the soil, of 1 or more ± connate leaf pairs (bodies); roots fibrous. **Leaves** opposite, connate to form an obconic body with a truncate apex, old leaves turning into ± hard sheaths enclosing new body, flat tops variously marked, sculptured or windowed; surface ± smooth, but epidermal cells often bluntly elevated, rarely papillate, with remarkable, thick outer epidermal walls encrusted with cutinised blocks and thick crystal layers, crystals increasing basipetally in size. **Flowers** solitary, rarely 2 or 3, from centre of fissure between leaves of a pair, shortly pedicellate, ebracteate, 15–40 mm in diameter; opening mid-afternoon, closing at sunset. **Sepals** 4–7. **Petals** 1–4-seriate, linear, white, yellow or orange. **Stamens** sometimes papillate towards base; staminodes 0. **Nectary** a crenulate ring. **Ovary** with parietal placentas; style short or 0; stigmas 4–7(9), filiform. **Fruit** a 4–7(9)-locular capsule, of Delosperma type; small; valves with broad valve wings; expanding keel single, stout, central on valve, divided at apex; covering membranes reduced to a limb or 0; closing bodies 0. **Seeds** highly variable in size, shape, colour and texture. $x = 9$.

Flowering autumn to early winter.

Distinguishing characters: compact dwarf perennials, mostly underground with paired leaves fused to form ± obconic bodies with flat or rounded, often windowed and ornamented tops; fruit 4–7(9)-locular; pedicels ebracteate.

Species 36, widespread in sthn Afr. (Namibia, Botswana and South Africa, but excluding Mpumalanga and KwaZulu-Natal) and occurs mainly in the Nama Karoo, succulent karoo and in rare cases in semi-arid savanna regions.

Machairophyllum Schwantes 2405070

(Ruschioideae: 8. Bergeranthus Group).

Schwantes: 187 (1927c); Herre: 198 (1971); Hammer: 77 (1991); Smith *et al.*: 220 (1998).

Perissolobus N.E.Br.: 278 (1930b).

Dwarf perennials, compact to caespitose, or with branching habit, up to 1.2 m in diameter; stems often rooting at nodes. **Leaves** opposite, crowded, up to ± 200 mm long, 20 mm broad, sharply triangular in cross section, mucronate, tapering to sharp points, canescent, surface dotless, very smooth, pale green, sometimes flushed with red, sometimes becoming whitish green; old leaves persistent; stomata superficial, outer epidermal wall densely filled with crystals. **Flowers** solitary or mostly in threes, on long pedicels with large bracts, up to 65 mm in diameter; usually nocturnal. **Sepals** 5–8, unequal, acuminate or occasionally obtuse. **Petals** densely 3–7-seriate, copper-red outside, yellow, golden or orange within. **Stamens** many, only inner stamens inconspicuously papillate, up to 1000 elements in androecium; staminodes 0. **Nectary** a crenulate ring, or of ± separate glands, sometimes with nectariferous depression at base. **Ovary** usually convex or conical above; placentas parietal; stigmas 5–15, slender. **Fruit** a 5–15-locular capsule; resembling capsule of *Cylindrophyllum* and therefore perhaps close to Leipoldtia type, but with a ± spongy tissue in covering membrane; small closing bodies and no additional closing devices at distal opening. **Seeds** ovoid, granulate. $x = 9$ (1 report).

Flowering late winter to early summer.

Distinguishing characters: tufted, robust perennials; leaves smooth, hard; flowers large to very large with many petals and staminodes, usually nocturnal; pedicels long, bracteate.

Species 10, predominantly Little Karoo, extending from Barrydale (Western Cape) in the west to Willowmore in the east, also recorded from Zuurberg in Eastern Cape.

Malephora N.E.Br. 2405071

(Ruschioideae: ? 4. Delosperma Group).
Brown: 12 (1927); Jacobsen & Rowley: 77 (1958); Herre: 200 (1971); Smith *et al.*: 268 (1998).

Crocanthus L.Bolus: t. 255 (1927a). *Hymenocyclus* Dinter & Schwantes: 27 (1927d); Friedrich: 56 (1970).

Shrubs or undershrubs, procumbent to prostrate with greyish to yellow stems and distinct internodes. **Leaves** opposite, slightly connate at base, up to 50 mm long, almost terete to trigonous, mucronate; epidermis ± flat, bladder cells rare, often flat, smooth, often with bluish, waxy coating. **Flowers** solitary or in rich dichasia, terminal or axillary, shortly pedicellate, ebracteate, up to 50 mm in diameter; opening at midday. **Sepals** 4 or 5. **Petals** free, yellow, golden, pink or reddish purple (often purplish outside and golden inside). **Stamens** often papillate towards base; staminodes present. **Nectary**: glands sometimes united into a crenulate ring. **Ovary** flat on top; placentas parietal; stigmas 8–12, small, plumose. **Fruit** a 8–12-locular capsule, of Drosanthemum type; parietal placentas often ending distally in prominent, sometimes bipartite knobs acting as closing bodies; base of locules divided by false septum which, together with splitting proper septa, forms pockets containing 1 or 2 seeds; these schizocarpous units are then dispersed. **Seeds** flat, rough with tubercles in rows. $x = 9$ (1 report).

Flowering time: Some species flowering in winter some in summer.

Distinguishing characters: creeping to rarely upright perennials; leaves waxy; flowers yellow to red; capsule 8–12-locular, sometimes with bifid closing bodies.

Species 14, from S Namibia to Namaqualand in the Northern Cape, through the Great and Little Karoos to the Eastern Cape, some known from the S Free State.

Marlothistella Schwantes 2405175

(Ruschioideae: 10. Ruschia Group).
Schwantes: 599 (1928c); Hammer: 82 (1995b); Smith *et al.*: 222 (1998).

Ruschia Schwantes in part.

Low succulent perennials, ± stemless or with short branches ± hidden by leaf bases, with tufts of long leaves arising from a large caudex. **Leaves** decussate, long, awl-shaped, smooth, dotted, easily desiccating. **Flowers** large, showy, single, sessile, with two small bracteoles strongly keeled on back. **Sepals** 5, of nearly equal length, inner ones bordered with a broad membrane, outer ones not so, all segments becoming ± dry. **Petals** lanceolate, purple with a line of darker purple running down the centre; opening in morning, closing at night. **Stamens** with thick, round, basally long-papillate filaments; staminodes basally shortly papillate. **Nectary** a very high, deeply crenate, dark green ring. **Ovary** with 5 (rarely 6) very high, grooved protuberances; placentas parietal; stigmas 5, greenish yellow, broadly awl-shaped, externally smooth, internally long-haired. **Fruit** a 5-locular capsule; covering membranes stiff, translucent; expanding keels widely divergent, reddish; closing bodies very large, whitish; valve wings 0. **Seeds** large, round, papillately sculptured.

Flowering winter.

Distinguishing characters: tufted perennials with tuberous roots; flowers solitary, large, with purple, striped petals; fruit 5-locular with large, white closing bodies.

Species 1: *Marlothistella stenophylla* (L.Bolus) S.A.Hammer, restricted to the Little Karoo in the Western Cape, in the districts of Calitzdorp, De Rust, Joubertina, Prince Albert, Uniondale and Willowmore.

Mesembryanthemum L. emend. L.Bolus 2405073

(Mesembryanthemoideae).
Linnaeus: 480 (1753); Bolus: 164–168 (1939); Friedrich: 81 (1970); Herre: 204 (1971); Smith *et al.*: 38 (1998); Gerbaulet (in press).

Callistigma Dinter & Schwantes: 644 (1928c). *Cryophytum* N.E.Br: 412 (1925). *Derenbergiella* Schwantes: 599 (1928c). *Eurystigma* L.Bolus: 179 (1930); Herre: 154 (1971). *Halenbergia* Dinter: 158, 200 (1937); Herre: 166 (1971). *Hydrodea* N.E.Br.: 412 (1925); Herre: 174 (1971). *Opophytum* N.E.Br.: 412 (1925); Herre: 240 (1971).

Annual to perennial (in the large species) fleshy herbs, prostrate, decumbent or erect; stems herbaceous, terete, angled or winged; with fibrous roots. **Leaves** decussate throughout or becoming alternate in inflorescences or alternate throughout, flat and tapering to a pseudopetiole, or terete, club-shaped or almost globular, shortly fused towards bases, margins occasionally undulate, epidermal bladder cells large to much flattened. **Flowers** in dichasia, rarely solitary, 10–60 mm in diameter; open in daylight hours. **Sepals** 5, 2 often foliaceous. **Petals** united at base into a short tube or sometimes free towards base; pink, yellow or white. **Stamens** arising within corolla tube; staminodes 0 or present. **Nectary** consisting of 5 shallow or deep grooves. **Ovary** semi-inferior; placentas axile; stigmas (4)5, filiform, erect. **Fruit** a 5-locular capsule, of Mesembryanthemum type; expanding keels extending to centre of fruit; covering membranes 0; valve wings present, either inflexed over valves or reflexed and fused in pairs. **Seeds** D-shaped or triangular, 0.5–1 mm long, black, brown, ochre or whitish, surface rough or ± smooth. $x = 9$ (polyploidy).

Flowering mainly in spring and summer.

Distinguishing characters: stems herbaceous, surfaces conspicuously covered with bladder cells.

Species 16; Southern Angola, Namibia, western and central South Africa with the distribution extending eastwards to the Eastern Cape. Species of *Mesembryanthemum* occur in North Africa, the Mediterranean region, California, along the western coast of South America and in Australia, but are likely to have been introduced to these areas.

Mestoklema N.E.Br. ex Glen 2405074

(Ruschioideae: 4. Delosperma Group).
Brown: 164 (1936); Friedrich: 87 (1970); Herre: 206 (1971); Glen: 454 (1981); Smith *et al.*: 308 (1998).

Densely branched shrubs up to 1 m high, with large, tuberous storage roots; branchlets minutely papillose, becoming pallid and slightly rough when dry; inflorescences persisting and becoming subspinose. **Leaves** opposite, free, trigonous to subterete; papulose when young, tufted in axils of old leaves, often leaving tooth-like projection on falling. **Flowers** small, pedicellate, in very rich dichasia. **Sepals** 5. **Petals** 1-seriate, linear, yellow, orange, salmon, or pink to purple, rarely white. **Stamens** many, inner ones papillate; staminodes conically collected. **Nectary** a crenulate ring. **Ovary** semi-inferior, conical or convex; placentas parietal; stigmas 5, erect, subulate. **Fruit** a 5-locular capsule, of Drosanthemum type; small, valves recurved when expanded; expanding keels contiguous and diverging towards tips, with narrow, membranous, acute wings; covering membranes present, but sometimes reduced by half; closing bodies 0. **Seeds** ovoid, smooth, brown.

Flowering spring to mid-summer.

Distinguishing characters: densely branched shrubs, with tuberous roots; flowers often in coppery shades, without filamentous staminodes; fruit with covering membranes which may be reduced.

Species 6, Namibia and South Africa and is widely distributed in a broad north-south band in South Africa, stretching southward from the central North-West through the Free State and Northern Cape to the coast of the Eastern and Western Cape. It extends into the Little Karoo in the west and occurs at two outlying localities in eastern and central Namibia.

Meyerophytum Schwantes 2405075

(Ruschioideae: 3. Mitrophyllum Group).
Schwantes: 436 (1927a); Bolus: 345–346 (1958c); Herre: 208 (1971); Smith *et al.*: 238 (1998).

Depacarpus N.E.Br.: 71 (1930a).

Low, compact shrublets with prostrate to ascending branches, internodes well visible, old dry leaf sheaths persistent. **Leaves** opposite, of 2 kinds: first leaf pair of season globose, grey-green; second united for a third to half length, deeper green, with conspicuous bladder cell idioblasts, base of latter developing into a papery parchment-like sheath enclosing first (assimilating) leaf pair of next season during dry period. **Flowers** solitary, terminal, long-pedicelled, thus well exserted above a long leaf pair, up to 40 mm in diameter; opening at midday, closing in afternoon. **Sepals** 5, subequal. **Petals** 3- or 4-seriate, linear, violet-purple or white. **Stamens** erect, inner ones papillate at base; staminodes 0. **Nectary** a crenulate ring. **Ovary** flat to concave on top; placentas parietal; stigmas 5, broad, plumose. **Fruit** a 5-locular capsule, of Mitrophyllum type but with deeply concave covering membranes with a prominent distal bulge touching the protuberance reaching from base of expanding sheet into locule; closing bodies 0; valve wings ample; expanding keels flat. **Seeds** ovoid or pear-shaped, smooth. $x = 9$.

Flowering after good rains in spring.

Distinguishing characters: compact shrublets with weak, repeatedly branching stems; resting leaf bodies conspicuous.

Species 1: *Meyerophytum meyeri* (Schwantes) Schwantes, restricted to the Northern Cape, from the Richtersveld to S Namaqualand.

Mitrophyllum Schwantes 2405078

(Ruschioideae: 3. Mitrophyllum Group).
Schwantes: 181 (1926b); Herre: 214 (1971); Poppendieck: 339 (1976); Smith *et al.*: 240 (1998).

Conophyllum Schwantes: 321 (1928b); Herre: 118 (1971). *Mimetophytum* L.Bolus: 252 (1954a); Herre: 212 (1971).

Loose shrubs or shrublets with a compact centre and long shoots; internodes woody or fleshy, often articulated; branches often decumbent. **Leaves** opposite, very large, 2 leaf pairs per season differing in length of basal sheath: first pair slightly united, flat above, rounded or keeled below; second pair a third to nearly completely united, forming a conical or cylindrical body, the connate one turning into a papery, parchment-like skin protecting the free one during dry months; minutely crystalline-papulose mainly towards tips. **Flowers** solitary or in lax cymes, terminal, pedicellate, bracteate, up to ± 30 mm in diameter; opening at midday, closing in late afternoon. **Sepals** 5, subequal. **Petals** 3- or 4-seriate, white, yellow or pale violet-red. **Stamens** collected into a cone and spreading later, basally only rarely papillate. **Nectary** a crenate ring. **Ovary** flat on top with 5(–7) prominent ridges; placentation parietal; stigmas 5(–7), subulate, often slightly plumose. **Fruit** a 5(–7)-locular capsule, of Mitrophyllum type with or without covering membranes; with or without closing ledges or bosses. **Seeds** ovoid or pear-shaped. $x = 9$.

Flowering from February to November.

Distinguishing characters: shrubs with very large, oblong, floppy leaf pairs with papery leaf sheaths, borne on erect woody stems.

Species 6, Richtersveld in the Northern Cape.

Monilaria (Schwantes) Schwantes 2405079

(Ruschioideae: 3. Mitrophyllum Group).
Schwantes: 69 (1929a); Herre: 216 (1971); Ihlenfeldt & Jörgensen: 49 (1973); Smith *et al.*: 242 (1998).

Freely branched, compact shrublets up to 200 mm high, with a short and a long leaf pair per season; branches constricted at nodes into short, often bead- or button-like segments covered by parchment-like remnants of old leaf pairs. **Leaves** opposite, glistening, soft, papillate, of 2 kinds: first pair small or rudimentary, forming a fleshy, almost completely closed sheath through which second pair emerges; second pair consisting of 2 long, cylindrical leaves somewhat flattened on upper side and fused only at base; when long leaves eventually shrivel this base develops into a persistent sheath covering bead-like stem segments and protecting next leaf pair. **Flowers** terminal, solitary, on elongated pedicel, papillate, ± 40 mm in diameter; bibracteate; opening midday, closing late afternoon; highly scented. **Sepals** 5, unequal, papulose or papillate. **Petals** in 3 or 4 series, white, yellow or pale violet-red. **Stamens** with or without hairs. **Nectary** a crenulate ring. **Ovary** shallow; flat on top with 5(–7) prominent sutural ridges; placentas basal or parietal; stigmas 5(–7), stout, ovate to subulate. **Fruit** a 5(–7)-locular capsule, of Mitrophyllum type, with prominent sutural ridges; valves widely spreading or reflexed; expanding keels ± widely diverging, broad at base, with inner ridges raised and with narrow, marginal wings; locules shallow, with or without covering membranes; closing devices 0. **Seeds** many in each locule, acutely ovoid, smooth. $x = 9$ (polyploidy).

Flowering autumn to winter.

Distinguishing characters: small shrublets with succulent constricted stems and persistent leaf bases, resembling a string of large beads.

Species 5, Namaqualand, in the Western and Northern Cape.

Mossia N.E.Br. 2405080

(Ruschioideae: ? 5. Stomatium Group).
Brown: 71, 151 (1930b); Herre: 218 (1971); Smith, Hartzer & Van Wyk: 16 (1997); Smith *et al.*: 272 (1998).

Dwarf, prostrate perennials; stems wiry to slightly woody, 1–1.5 mm in diameter, with distinct nodes and internodes; pinkish green when young, brown when old. **Leaves** opposite, similar, connate at base, trigonous to club-shaped, usually shorter than 10 mm, glabrous, dull sea-green to dark green; epidermis with tanniniferous idioblasts, resulting in a slightly verrucose surface. **Flowers** solitary, terminal, subsessile or shortly pedicellate, ± 10 mm in diameter; opening at night; faintly sweet-scented. **Sepals** 5, subequal, united at base to form a short tube, ovate-triangular, longer than petals, pinkish green. **Petals** 1- or 2-seriate, inserted at base of calyx tube, free, narrowly linear to subspatulate, obtuse or occasionally acuminate, ± 4 × 1.0–1.5 mm, papery, off-white with a slight cream tinge. **Stamens** erect to slightly inflexed, inner whorl bearded at base; stamino-

des present or 0; pollen yellowish, tricolpate, semitectate with reticulate sculpture and supratectal spinules. **Nectary** a dark green, crenulate ring, broken ± clearly into 5 parts corresponding with sepals. **Ovary** deeply concave on top; placentas basal to parietal; stigmas 5(6), subulate, 2 mm long, curved outwards. **Fruit** a 5(6) locular capsule, ± of Delosperma type but without valve wings; expanding tissue composed of radial, contiguous keels to apex of each valve and expanding sheet; covering membranes 0 but ledges of deeply split septa may cover locules slightly; closing bodies 0 but funicles conspicuous, swelling when wet. **Seeds** ovoid, smooth.

Flowering early to mid-summer.

Distinguishing characters: creeping, very small perennials; flowers with hypanthium, white, opening at night.

Species 1: *Mossia intervallaris* (L.Bolus) N.E.Br., in a narrow band more or less to the west of the Drakensberg massif, from Barkly East in the Eastern Cape to the E Free State and NW Lesotho. Isolated populations have been recorded from the Free State, Mpumalanga and Gauteng.

Muiria N.E.Br. 2405081

(Ruschioideae: 4. Delosperma Group).
Brown: 116 (1927a); Herre: 220 (1971); Smith *et al.*: 118 (1998).

Dwarf, stemless, single-bodied or sparsely clustered perennials; seasonally covered by withered, whitish felt-like leaf sheaths; roots fibrous. **Leaves** fused into pairs forming a somewhat spherical, soft body, with a small fissure near apex, and fine, velvety hairs covering stomata. **Flowers** solitary, rupturing top of body when emerging; pedicel clavate, short, ebracteate; flowers ± 20 mm in diameter; open during day. **Petals** in several series, free, linear to filiform, whitish to purple. **Stamens** ± epapillate. **Sepals** 6, oblong, with membranous tips. **Nectary** a crenate ring ± clearly broken into 6 parts corresponding with sepals. **Ovary** half-inferior, partly immersed in stout pedicel; placentas parietal; stigmas 6, short, stout, recurving. **Fruit** a 6-locular capsule, of Delosperma type; placenta prominent; forming pockets; valves deltoid, expanding horizontally; expanding keels contiguous with broad, marginal valve wings as long as valves; valve wings connate at base, forming pockets; covering membranes or closing devices 0. **Seeds** many in each locule, ovoid, slightly compressed, smooth, brown. $x = 9$ (1 report).

Flowering early summer.

Distinguishing characters: single-bodied perennials with leaf pairs entirely fused, hairy; flowers rupturing tips of bodies when emerging.

Species 1: *Muiria hortenseae* N.E.Br., confined to a small region on the northern side of the Langeberg range in the Barrydale District of the Little Karoo, Western Cape.

Namaquanthus L.Bolus 2405082

(Ruschioideae: 9. Lampranthus Group).
Bolus: 257 (1954b); Herre: 222 (1971); Smith *et al.*: 334 (1998).

Shrublets up to ± 300 mm high; branches with short internodes, up to 15 mm in diameter, covered by persistent, dry leaves. **Leaves** opposite, ± terete to subcylindric, up to ± 60 mm long, 10 mm in diameter, united at base into sheath, surface smooth; stomata not sunken. **Flowers** solitary, terminal, pedicellate, bibracteate, up to 60 mm in diameter; open from morning till evening. **Sepals** 4(–6), unequal. **Petals** 4-seriate, outer ones narrowly spatulate, inner ones becoming shorter towards centre of flower, purple. **Stamens** crowded; filaments purple, epapillate. **Nectary** a finely crenulate pink ring. **Ovary** flat or convex on top; stigmas (8–)12(–16), subulate, purple. **Fruit** a (8–)12(–16)-locular capsule, of Lampranthus type, woody and rounded; valve wings present, narrow; covering membranes radially thickened; expanding keels parallel, diverging at tips; closing bodies 0. **Seeds** echinate with very long papillae along back.

Flowering in winter.

Distinguishing characters: compact perennials; leaves cylindrical, fused at the bases; flowers magenta with spoon-shaped outer petals; seeds echinate.

Species 1: *Namaquanthus vanheerdii* L.Bolus, restricted to a small area northwest of Springbok in Namaqualand, Northern Cape.

Namibia (Schwantes) Schwantes 2405083

(Ruschioideae: 7. Dracophilus Group).
Schwantes: 106 (1927d); Walgate: 171 (1939); Herre: 224 (1971); Smith *et al.*: 120 (1998).

Juttadinteria subg. *Namibia* Schwantes: 182 (1926b).

Dwarf perennials forming dense, compact clumps up to 100 mm high, 200 mm in diameter. **Leaves** opposite, 4–6 per branch, connate at base, semi-ovoid to trigonous, velvety, greyish from flaky wax cover; epidermis xeromorphic, papillae longer than their basal diameter, uniform over entire surface. **Flowers** solitary, terminal, sessile or shortly pedicellate, up to 30 mm in diameter; often not perfectly round but somewhat 4-sided in appearance; opening in morning and closing in evening (*N. cinerea* opens in morning and remains open thereafter). **Sepals** 5, unequal, finely papillate. **Petals** 1-seriate, pink, rarely white. **Stamens** collected in a cone, with bearded filaments; staminodes 0. **Nectary** a crenulate ring. **Ovary** concave on top with a central cone; placentas parietal; stigmas (9–)12(–28), subulate. **Fruit** a (9–)12(–28)-locular capsule, close to Delosperma type; convex; expanding keels parallel along base and diverging and lacerate towards tips, with oblong valve wings; covering membranes reduced to limb or 0; closing devices 0.

Flowering mid-winter to late spring.

Distinguishing characters: dense, compact perennials; leaves thick, basally fused, velvety, waxy; flowers solitary, pink or white, square-looking; opening in the morning or perpetually open.

Species 2, occurs in the surroundings of Lüderitz in SW Namibia and also a few kilometres east of Prince of Wales Bay, ± 60 km south of Lüderitz.

Nananthus N.E.Br. 2405084

(Ruschioideae: 6. Titanopsis Group).
Brown: 433 (1925); Bolus: 382 (1958d); Friedrich: 88 (1970); Herre: 226 (1971); Smith *et al.*: 162 (1998).

Prepodesma N.E.Br.: 279 (1930b).

Dwarf, tufted, glabrous perennials, with tuberous roots. **Leaves** opposite, united at base and ground-hugging with bases often buried in soil, boat-shaped, ± depressed-trigonous in section, spreading, dull green; surface rough, punctate with whitish dots. **Flowers** solitary, pedicelled to subsessile, bracteate, 20–30 mm in diameter; opening after noon, closing at dusk. **Sepals** 5. **Petals** 2- or 3-seriate, yellow, rarely white, often with a central red stripe. **Stamens**: inner filaments bearded near base; staminodes present or 0. **Nectary** a crenate ring. **Ovary** flattish to conical on top; placentas basal or parietal; stigmas 6–10, slender, papillate. **Fruit** a 6–10-locular capsule, resembling Delosperma type, but the rounded,

semiglobose base of capsule differs from typical form, sometimes as tumble fruit; expanding keels strictly radial; closing bodies 0; rims of septa very narrow. **Seeds** ovoid or somewhat pear-shaped, smooth. $x = 9$.

Flowering almost throughout the year, but not in winter in habitat.

Distinguishing characters: small rosette-forming perennials with tuberous roots; leaves pointed at tips, with almost concave upper surfaces and pale dots; flowers in shades of yellow, often with striped petals.

Species 10, widespread in the climatically severe interior of sthn Afr., from near Graaff-Reinet in the Great Karoo (Eastern Cape), northward through the Northern Cape and the central Free State to around Potchefstroom in the North-West, extending into the south of Gauteng. To the west the distribution stretches to near Upington and Bushmanland in the Northern Cape. The occurrence of an apparently isolated population in Namibia, due east of Windhoek, near the border with Botswana, highlights a lack of collections from the Northern Cape and Botswana.

Nelia Schwantes 2405085

(Ruschioideae: 7. Dracophilus Group).
Schwantes: 92 (1928d); Herre: 228 (1971); Smith *et al.*: 150 (1998).

Sterropetalum N.E.Br.: 266 (1928d).

Dwarf, tufted, ± stemless perennials; with fibrous roots. **Leaves** opposite, ± free, trigonous, elongate, apically rounded, greyish to light green; epidermis ± smooth, with a thick crystal layer in outer wall, stomata at base of slightly elevated subsidiary cells. **Flowers** 1–3, often in ternate dichasia, shortly pedunculate, bibracteate (laterals also), ± 20 mm in diameter; opening for first time in morning and remaining open continuously for ± 3 weeks. **Sepals** 5, unequal, shortly connate above ovary. **Petals** in several series, linear-spatulate, often shorter than sepals, emarginate, relatively stiff with short hairs at base, white, rarely pale pink; passing into white staminodes and stamens, and all fused into a short tube or hypanthium. **Stamens** and **staminodes** stiff, remaining in that position during entire anthesis. **Nectary** obscure. **Ovary** flattish or slightly convex; placentas basal; stigmas 5, small, broadly 3-angled, green. **Fruit** a 5-locular capsule, of Delosperma type, but expanding keels parallel, stout, yellow, diverging distally; covering membranes vestigial, developed as rather broad rectangular rims of septa; sutures slightly raised in centre; valves recurved when expanded; valve wings broad; closing devices 0. **Seeds** ± 1 mm long, somewhat pear-shaped to cordate, light yellow, minutely textured.

Flowering sporadically over a long period during winter months.

Distinguishing characters: compact, clump-forming perennials; leaves smooth; petals stiff; flowers, once open, do not close again.

Species 4, Richtersveld in the northwestern part of the Northern Cape, and extends southwards into Namaqualand.

Neohenricia L.Bolus 2405086

(Ruschioideae: 5. Stomatium Group).
Bolus: 251 (1931); Bolus: 51 (1938a); Herre: 230 (1971); Hammer: 84 (1994a); Smith *et al.*: 166 (1998).

Henricia L.Bolus: 39 (1936).

Freely branching, dwarf, prostrate perennials, forming mats less than 20 mm high, often rooting at nodes; mimicking its surroundings and difficult to find; adventitious roots thickened as storage organs. **Leaves** opposite, 4–6 pairs per branch, ± erect, somewhat connate at base, trigonous to club-shaped or terete, up to ± 10 mm long, apex broad, covered by bands of reddish green, orange or greyish green warts. **Flowers** solitary, ± 12 mm in diameter, on short, slender, curved pedicels, ± 20 mm long, without bracts; opening at twilight and closing before dawn; pleasantly scented like pineapple or liquorice. **Sepals** 5, subequal. **Petals** 2-seriate, yellowish, pinkish or greenish. **Stamens** glabrous, epapillate. **Nectary** an obscurely crenulate ring. **Ovary** somewhat convex on top; placentation basal to parietal; stigmas 4–6, slender, golden yellow. **Fruit** a 4–6-locular capsule, of Delosperma type with erect septa; expanding keels parallel, diverging slightly at tips; valve wings 0; covering membranes sometimes well developed, otherwise reduced to a limb; closing devices 0. **Seeds** pear-shaped, coarse-textured, attached to floor and walls of capsule.

Flowering over a long period in summer.

Distinguishing characters: minute perennials with strongly textured leaves; pedicels long and slender; flowers nocturnal, highly scented.

Species 2, occurs in a belt stretching from Victoria West in the Northern Cape to Fauresmith in the Free State. The recently discovered species: *Neohenricia spiculata* S.A.Hammer, occurs in small isolated populations near Sterkstroom, in the Eastern Cape.

Octopoma N.E.Br. 2405087

(Ruschioideae: 11. Leipoldtia Group).
Brown: 72, 126 (1930a); Herre: 232 (1971); Smith *et al.*: 374 (1998); Hartmann: 44 (1998c).

Dwarf shrubs becoming woody with age, up to 250 mm high, to 250 mm in diameter; branches erect to spreading; internodes ochre to darker. **Leaves** opposite, united at base, decurrent on stem, short, thick, ± triquetrous, often inflated, margins and keel ± serrate or with small teeth, surfaces rough to smooth; dark green. **Flowers** 1(–3), terminal, shortly pedicellate or subsessile, often embraced by bracts. **Sepals** 4(5), unequal. **Petals** 2- or 3-seriate, white to purple. **Stamens** arranged in a cone, filaments sometimes bearded; staminodes present. **Nectary** a crenulate, dark green ring. **Ovary** convex above; placentas parietal; stigmas 6–8, subulate. **Fruit** a 6–8-locular capsule, close to Leipoldtia type, brown, markedly convex on top in most cases; expanding keels diverging, lacerate towards tips; valve wings absent or narrow, broadest in middle; closing bodies large, white, flat; covering membranes rising towards centre; distal closing devices 0. **Seeds** rough-textured.

Flowering mainly in winter.

Distinguishing characters: fruit firm, brown, 8-locular.

Species 8, in two separate areas in South Africa, one in northern Namaqualand, Northern Cape; the other in the Little Karoo, Western Cape. The species in this genus do not form a natural group since they have been included merely on the number of locules in the fruit (mostly 8).

Odontophorus N.E.Br. 2405088

(Ruschioideae:11. Leipoldtia Group).
Brown: 12 (1927a); Herre: 234 (1971); Hartmann 161 (1976); Hammer 75 (1993a); Hammer: 59 (1995g); Smith *et al.*: 190 (1998).

Dwarf, compact perennials, forming small clumps or mats, rarely forming large cushions up to 500 mm in diameter, with or without long shoots or trailing branches, or caespitose; with fleshy rootstock. **Leaves** opposite, united in basal parts, in 1 or 2 pairs, trigonous, elongate, soft and fleshy, margins and keel with white, rarely pinkish teeth, greyish green, often hairy; surface with prominent elevations above tannin idioblasts, stomata in valleys. **Flowers** solitary, sessile or shortly pedi-

cellate, up to ± 30 mm in diameter; opening by midday, closing by twilight; strongly scented. **Sepals** 4 or 5. **Petals** 3–6-seriate, free, pale yellow to deep yellowish orange, rarely pink or white. **Stamens** with filaments papillate towards base. **Nectary** a crenulate ring. **Ovary**: placentas parietal; stigmas (8–)10(11), subulate. **Fruit** a (8–)10(11)-locular capsule, of Leipoldtia type with a thick semiglobose hairy base; expanding keels parallel, toothed, terminating in diverging membranous points; covering membranes stiff; closing bodies large, nearly closing the opening. **Seeds** compressed, light brown. $x = 9$.

Flowering late winter to early spring.

Distinguishing characters: perennials forming small clumps or mats; leaves keeled, greyish green, often hairy, dentate; flowers yellow to orange; fruit 11-locular.

Species 5, found in the vicinity of Steinkopf in the Richtersveld, Northern Cape.

Oophytum N.E.Br. 2405089

(Ruschioideae: 3. Mitrophyllum Group).
Brown: 413 (1925); Herre: 236 (1971); Ihlenfeldt: 303 (1978); Smith *et al.*: 122 (1998).

Dwarf, compact, heterophyllous perennials less than 25 mm high. **Leaves** opposite, largely connate and united into small ovoid bodies with a somewhat gaping fissure, with visible bladder cell idioblasts on surfaces, bright brownish red towards end of growing season, otherwise dark green to brownish green or yellowish green; gradually absorbed by following leaf pair and leaving whitish sheath; two leaf pairs develop per season on each of up to 20 branches per individual. **Flowers** solitary, with bracts exserted from orifice, ± 25 mm in diameter; opening midday, closing in evening. **Sepals** 6(7), shortly tubular. **Petals** 2- or 3-seriate, white, pink or pale violet. **Stamens** with filaments papillate at base, white, pink or pale violet; staminodes present, coloured as petals. **Nectary** a crenulate ring. **Ovary** somewhat convex with (5)6 ridges on top; placentas basal/parietal; stigmas (5)6, filiform. **Fruit** a (5)6-locular capsule, of Delosperma type; developing directly on top of drying plant body; valve wings broad; covering membranes rarely present as narrow rims over locules; closing bodies 0. **Seeds** many in each locule, small, compressed. $x = 9$.

Flowering in winter.

Distinguishing characters: stemless perennials, with clusters of ovoid, papillate leaves; old leaves forming papery sheaths enclosing the emerging young leaf pair.

Species 3, restricted to the quartz fields of the Knersvlakte north of Vanrhynsdorp in the Western Cape.

Orthopterum L.Bolus 2405092

(Ruschioideae: 5. Stomatium Group).
Bolus: 280 (1927h); Bolus: 130 (1928); Bolus: 109 (1937/1938); Herre: 242 (1971); Smith *et al.*: 192 (1998).

Dwarf, compact perennials, forming small, cushion-like clumps; branches with 6–8 leaves. **Leaves** opposite, slightly unequal, elongate-trigonous, spreading, up to ± 30 mm long, 8 mm broad, with few or no teeth on margins, smooth, old leaves persistent, shiny; no crystals in outer epidermal wall. **Flowers** solitary, sessile to subsessile, ± 50 mm in diameter, ebracteolate; opening in afternoon, closing by evening. **Sepals** 5, subequal. **Petals** 3- or 4-seriate, golden yellow within, reddish outside. **Stamens** collected into a cone, epapillate. **Nectary** of 5 separate, greenish brown crenulate glands. **Ovary** obtusely conical on top; placentas parietal; stigmas 5 or 6, filiform. **Fruit** a 5- or 6-locular capsule; septa of fruit separated into two, their upper part not flat as in *Faucaria* but arching on top of capsule; valve wings basally connate with valves, moving upwards into an erect position when fruit opens and valves fold back. **Seeds** pear-shaped, tuberculate.

Flowering during late autumn and winter.

Distinguishing characters: plants cushion-forming; leaves smooth, soft, unmarked; flowers yellow; fruit with septa arching over expanded capsules.

Species 2, subtropical thickets of the Eastern Cape.

Oscularia Schwantes 2405093

(Ruschioideae: 4. Delosperma Group).
Schwantes: 187 (1927c); Herre: 244 (1971); Glen: 693 (1980); Smith *et al.*: 336 (1998); Hartmann: 44 (1998c).

Densely branched shrublets, with erect or spreading reddish stems. **Leaves** opposite, subequal, somewhat united at base, triquetrous to trigonous, short, up to ± 20 mm long and 13 mm broad, mostly with prominently dentate keel and margins (red-toothed in one species), greyish green to pale blue waxy leaves. **Flowers** solitary or in rich cymes, mostly on bibracteate peduncles, rarely sessile, up to ± 15 mm in diameter; remaining open; almond-scented. **Sepals** 5. **Petals** not much more than 1-seriate, white to pink. **Stamens** and short **staminodes** collected into a cone, both papillate near base. **Nectary** of 5 ± separate, dark green, crenulate glands. **Ovary** convex to conical on top; placentas parietal; stigmas 5, concealed by stamens. **Fruit** a 5-locular capsule, of Lampranthus type; grey to brown; expanding keels diverging from base, more than half as long as valves; valve wings very broad and rectangular; covering membranes with inconspicuous closing ledges at distal ends; closing devices 0, but placenta ending in a tiny to small knob. **Seeds** ovoid, verrucose, brown. $x = 9$.

Flowering mid-winter to mid-summer.

Distinguishing characters: small shrubs with greyish green, waxy, sometimes dentate leaves; flowers scented; stamens and staminodes collected into a cone.

Species 23, typically in the fynbos vegetation of the Western Cape, extending slightly into the Northern Cape, a single species: *Oscularia deltoides* (L.) Schwantes, has been collected just east of Albertinia in the Western Cape.

Ottosonderia L.Bolus 2405094

(Ruschioideae: 11. Leipoldtia Group).
Bolus: 292 (1958e); Herre: 246 (1971); Smith *et al.*: 376 (1998).

Compact shrublets with short vegetative growth and prominent, elongated floral branches with persistent inflorescences/infructescences. **Leaves** of two markedly different types: (1) on vegetative growth: opposite, ± united at base, digitiform, subterete, up to ± 60 mm long, 5 mm broad, stomata slightly sunken; outer epidermal wall with a thin to moderate crystal layer; (2) hypsophylls or bracts on fertile branches: opposite, leaf pairs fused ± halfway, basal part sheathing stem, free parts ± boat-shaped but not keeled, much shorter than type (1). **Inflorescence** unique. **Flowers** solitary per season, but inflorescence at length developing into a wide-spreading perennial cyme by annual addition of one pair of bracteate flowers below each terminal fruit, with hardened remnants of bracts and fruits remaining throughout. **Sepals** 4, apiculate; outer ones compressed and keeled, inner ones with brown, membranous mar-

gins. **Petals** 1–2-seriate, purplish pink. **Stamens** and **staminodes** ± 5-seriate, papillate at base. **Nectary** a fairly prominent crenate ring. **Ovary** convex on top; placentas parietal; stigmas (6–)8, narrowly subulate. **Fruit** a (6–)8-locular capsule, close to Ruschia type but valves with low rims, yet forming a rounded dome, valves erect when open, without wings; expanding keels erect, thick; covering membranes well developed; closing bodies large. **Seeds** ± ovoid, ± 1.25 mm long, brown.

Flowering in winter.

Distinguishing characters: perennials with compact vegetative growth and elongated reproductive parts; inflorescences persistent.

Species 2, very localised distribution in Namaqualand, with two separate distributions, the one to the north and the other just south of the border between the Northern and Western Cape.

Phyllobolus N.E.Br. 2405152

(Mesembryanthemoideae).
Brown: 413 (1925); Brown: 1 (1926a); Gerbaulet: 385 (1995); Gerbaulet: 145 (1997); Smith *et al.*: 42 (1998).

Anoebophyllum N.E.Br.: 433 (1925); Herre: 68 (1971). *Sphalmanthus* N.E.Br.: 433 (1925); Friedrich: 126 (1970); Herre: 290 (1971).

Decumbent to erect shrublets or subshrubs, often with thickened roots, or prostrate to decumbent geophytes; stems corky or lignified throughout or only basally so, epidermal bladder cells conspicuous, occasionally hair-like, rarely flattened. **Leaves** decussate throughout or becoming alternate in inflorescences or alternate throughout, subcylindrical, rarely flattened, shortly fused towards bases, deciduous or drying and persistent (marcescent). **Flowers** in dichasia or solitary, (10–)20–30(–40) mm in diameter; in most species flowers close at night, some open at night and others never close. **Sepals** 4 or 5, often fused basally into a short tube. **Petals** in various shades of green, yellow, orange, red, pink or whitish. **Staminodes** present or 0. **Nectary** consisting of 5 separate grooves. **Ovary** mostly conical on top; placentas axile; stigmas 4 or 5, subulate. **Fruit** a 4- or 5-locular capsule, of Mesembryanthemum type; expanding keels extending to centre of fruit; covering membranes 0; valve wings mostly present and inflexed over valves or rarely reflexed and fused in pairs or 0. **Seeds** D-shaped or horseshoe-shaped, 1.1–1.8 mm long, usually black without a crest, or brown with a crest, surface rough, rarely smooth.

Flowering from mid-winter to mid-summer.

Distinguishing characters: perennials, with conspicuous bladder cell idioblasts on leaves; if rootstock is tuberous, leaves are summer-deciduous.

Species 31, widespread in S Namibia, and in the western and central parts of South Africa (Northern, Western, and Eastern Cape and Free State).

Pleiospilos N.E.Br. 2405097

(Ruschioideae: 11. Leipoldtia Group).
Brown: 433 (1925); Herre: 252 (1971); Hartmann & Liede: 433 (1986); Smith *et al.*: 124 (1998).

Punctillaria N.E.Br.: 212 (1926c).

Dwarf, compact to caespitose, sometimes unbranched perennials, with 1–4 pairs of leaves on each branchlet. **Leaves** opposite, equal, connate at base, broad, thick and firmly fleshy, flat above, rounded on back, grey-green or brownish, usually dotted, covered with a thick, irregular wax layer. **Flowers** 1–3 on a plant, terminal between leaves, sessile or shortly pedicellate, bracteate, up to ± 80 mm in diameter; opening mid-afternoon until after dusk. **Sepals** (4)5 or 6(–8), sometimes united into a short tube above ovary. **Petals** free, yellow to orange, rarely white or pinkish. **Stamens** epapillate, rising from a short pulvinate tube above annular, dark green holonectary. **Ovary** ± flat on top with conical centre; placentas parietal; stigmas 10–12, filiform, diverging. **Fruit** a 10–12-locular capsule, a derived version of Leipoldtia type with broad, apically tapering valve wings; very firm covering membranes; large white to brown closing bodies of endocarpal or placental origin. **Seeds** compressed-ovoid, minutely tuberculate, dark brown. $x = 9$.

Flowering in winter (*P. nelii* Schwantes) or autumn.

Distinguishing characters: compact perennials; leaves keeled, resembling stones, distinctly pellucid-dotted, waxy.

Species 4, main distribution in the Little Karoo, straddling the border between the Western and Eastern Cape, also extends further north into the arid south-central parts of the Great Karoo in the Northern Cape.

Polymita N.E.Br. 2405098

(Ruschioideae: 10. Ruschia Group).
Brown: 72 (1930a); Herre: 254 (1971); Hartmann: 29 (1996b); Smith *et al.*: 352 (1998).

Glabrous shrubs up to 400 mm high. **Leaves** opposite, united for ± half their length into a sheath with longitudinal lines, apical portion spreading, acute or mucronate, triangular in cross section, with margins and keel somewhat horny, often serrate; stomatal apparatus sunken, hidden under a dome of connate peristomatal papillae. **Flowers** solitary or in cymes, pedicellate, ± 20 mm in diameter; bracts enclosing lower part of flower. **Sepals** 5, subequal. **Petals** often in 5 groups, filiform-linear, white. **Stamens** incurved, concealed by longer and many more white staminodes in 3 or 4 series. **Nectary** a crenulate ring. **Ovary** with placentas parietal; stigmas (8–) 10(–18), subulate. **Fruit** a (8–)10(–18)-locular capsule, with top elevated and white, and base ± funnel-shaped; close to Ruschia type, but with valve wings and rather shallow locules; expanding keels abruptly diverging towards apex, with broad, terminal wings; covering membranes straight, without a rim at top; closing bodies large and white (*P. albiflora*) or smaller and dark (*P. steenbokensis*). **Seeds** smooth.

Flowering in summer.

Distinguishing characters: shrubby perennials with leaves fused at their bases, stem-sheathing, diverging at tips; flowers white; fruit 10–18-locular.

Species 2, northern Namaqualand in the Northern Cape.

Prenia N.E.Br. 2405099

(Mesembryanthemoideae).
Brown: 412, 413 (1925); Friedrich: 93 (1970); Herre: 256 (1971); Gerbaulet: 25 (1996b); Smith *et al.*: 46 (1998).

Phyllobolus N.E.Br. in part; Hartmann: 47 (1993).

Prostrate to erect subshrubs with fibrous roots; branches weakly lignified, green parts of stem becoming dry and remaining on stem as a thick whitish layer, smooth. **Leaves** decussate or becoming alternate in inflorescences, shortly fused towards bases, ± flat, somewhat triquetrous, or subcylindrical, with a thick wax layer which can easily be wiped off. **Flowers** in bracteose dichasia, 20–40 mm in diameter; open in daylight. **Sepals** 4 or 5, fused at base into a short tube. **Petals** white, yellow or pink; petals, stamens and staminodes fused into a short tube towards bases. **Staminodes** present.

Nectary consisting of 4 separate grooves. **Ovary** with axile placentas. **Fruit** a 4-locular capsule of Mesembryanthemum type, lower part funnel-shaped with deep locules; expanding keels extending to centre of fruit; covering membranes 0; valve wings present. **Seeds** D- or kidney-shaped, ± 1.3 mm long, black, without or with indistinct crest, surface rough. $x = 9$ (polyploidy).

Flowering from spring through summer to autumn.

Distinguishing characters: soft, smooth, creeping (except *P. sladeniana* (L.Bolus) L.Bolus) stems.

Species 6, in the karroid areas of the Western, Eastern, and Northern Cape and in S Namibia.

Psammophora Dinter & Schwantes 2405100

(Ruschioideae: 7. Dracophilus Group).
Schwantes: 188 (1926b); Friedrich: 94 (1970); Herre: 258 (1971); Hartmann: 29 (1996b); Smith *et al.*: 224 (1998).

Shrubs up to 600 mm high or compactly tufted, dwarf shrubs ± 150 mm high, sometimes with stem-crown drawn below ground. **Leaves** decussate, elongate to short, fleshy, 3-angled to rounded in cross section, with a rounded keel and often a pinkish base, dull green to bluish grey-green; epidermis with prominent cells with secondary anticlinal walls, stomatal apparatus and normal cells in a sunken position, surface producing a viscous mucilage to which sand grains adhere and cover leaves. **Flowers** solitary, terminal, pedicellate, up to ± 25 mm in diameter, bibracteate; opening at midday, closing by dusk; scented. **Sepals** 4, subequal, sticky. **Petals** linear, obtuse, white to light violet. **Stamens** and **staminodes** present. **Nectary** a crenulate ring. **Ovary**: placentas parietal; stigmas 5 or 6(7), filiform. **Fruit** a 5- or 6(7)-locular capsule, of Delosperma type; flattish; expanding keels parallel, ending in rather long, rounded, light yellow, crenulate wings, lacerate at apex; covering membranes vestigial; closing bodies 0. **Seeds** pear-shaped, minutely tuberculate, light brown with orange tint.

Flowering in winter.

Distinguishing characters: tufted or shrubby perennials; leaves with sticky epidermis to which sand adheres; fruit with rudimentary covering membranes, without closing bodies.

Species 4, in full sun on rocky slopes and plains from Lüderitz, Namibia, to the Richtersveld, Northern Cape.

Psilocaulon N.E.Br. 2405101

(Mesembryanthemoideae).
Brown: 433 (1925); Herre: 260 (1971); Ihlenfeldt & Bittrich: 289 (1985); Klak & Linder: 301 (1998); Smith *et al.*: 28 (1998).

Herbs, subshrubs or shrubs, perennial or annual to biennial, prostrate, decumbent or erect; stems (young) articulate, succulent and green, old ones becoming woody; bladder cells inconspicuous, hair-like, dome-shaped or much flattened. **Leaves** decussate and becoming alternate in inflorescence, free or shortly fused at base, semiterete or terete, dry and persistent or deciduous, sometimes with mucro. **Flowers** terminal or lateral, in cymes or solitary, less than 20 mm in diameter. **Sepals** 4 or 5, fused into a short tube. **Petals** free or shortly fused towards base, white, pink, puce or rarely pale yellow to greenish. **Staminodes** gathered around stamens, thus forming a cone. **Nectary** consisting of 4 or 5 narrow grooves or absent. **Ovary** with axile placentas. **Fruit** a 4- or 5-locular capsule, of Mesembryanthemum type, expanding keels extending to centre of fruit; valve wings inflexed over valves. **Seeds** D-shaped or obtusely triangular in outline, 0.5–1.2 mm long, rough or almost smooth, ochre or brown. $x = 9$ (1 report, polyploidy).

Flowering from early- to mid-summer.

Distinguishing characters: stems succulent, smooth or with minute bladder cell idioblasts; flowers with broad filamentous staminodes which are ragged at tips, transparent and gathered into a cone.

Species 13, widespread in southern, central and western South Africa, W Namibia and S Angola and occurs in both summer- and winter-rainfall regions.

Rabiea N.E.Br. 2405102

(Ruschioideae: 5. Stomatium Group).
Brown: 92 (1927b); Bolus: 369 (1958f); Herre: 262 (1971); Smith *et al.*: 226 (1998).

Compact, tufted, dwarf perennials with fleshy or tuberous rootstock. **Leaves** 4–6 on a branch, 2 of a pair ± dissimilar, flattish on upper surface and distinctly to indistinctly keeled on lower surface, pointed from a rather broad base, rarely cylindrical, trigonous to triquetrous; surface rough, with prominent white or blackish green spots or elevations above tannin idioblasts. **Flowers** solitary, bibracteate, subsessile to shortly pedicelled; opening at midday, closing by evening. **Sepals** 5(6 or 7) ± equal, fused at base to form a short hypanthium on which petals and stamens arise. **Petals** 3- or 4-seriate, obtuse or emarginate, bright yellow to yellowish orange. **Stamens** papillate below; placentas parietal; stigmas 7–10, slender, papillate. **Nectary** positioned at upper rim of hypanthium. **Ovary** bowl-shaped on top; placentas parietal; stigmas 7–10, linear. **Fruit** a 7–10-locular capsule, close to Titanopsis type but with a rather rounded top and base, also browner and firmer than typical form; valves with wings reaching above halfway up; expanding keels contiguous in basal section, then diverging widely, shortly aristate, almost reaching apex of valve; covering membranes present; closing bodies 0. **Seeds** ± pear-shaped, minutely muricate, dark brown.

Flowering in spring and summer.

Distinguishing characters: compact perennials, forming rosette; leaves dotted; flowers yellow.

Species 6, occurs from the central Eastern Cape through the central parts of the Free State, an outlier in the distribution has been recorded from the E Northern Cape.

Rhinephyllum N.E.Br. 2405103

(Ruschioideae: 5. Stomatium Group).
Brown: 92 (1927b); Herre: 264 (1971); Smith *et al.*: 168 (1998).

Peersia L.Bolus: t. 264 (1927f). *Neorhine* Schwantes: 22 (1930).

Dwarf, tufted perennials up to 100 mm high or shrublets with visible, woody internodes; sometimes with woody or tuberous rootstocks. **Leaves** opposite, slightly united at base, clavate to semiterete, upper surface ± flat, lower surface rounded or slightly keeled, rarely with teeth, apical surface with hard, white tubercles. **Flowers** solitary, terminal, pedicellate, up to ± 30 mm in diameter, without bracts; opening midday, afternoon or evening; scented. **Sepals** 5, free or forming short tube above ovary in *R. pillansii*. **Petals** 1–5-seriate, free, white to yellow. **Stamens** with some filaments bearded at base. **Nectary** varying from a ring to 5 separate, sometimes conspicuous, crenate glands. **Ovary** slightly convex on top; placentas parietal; stigmas 5, subulate, somewhat plumose. **Fruit** a 5-locular capsule, small, with sutures slightly raised and gaping; valves deltoid, reflexed when expanded; of Delosperma type but with diverging ex-

panding keels and marginal valve wings; covering membranes often 0 or much reduced; closing bodies 0. **Seeds** many in each locule, globose-ovoid, slightly compressed, ± smooth. $x = 9$.

Flowering from spring to mid-summer.

Distinguishing characters: dwarf succulents, often with textured leaves; flowers white to yellow; pedicels ebracteate.

Species 12, occurs mainly in the Little and Great Karoos of the Northern, Western and Eastern Cape.

Rhombophyllum (Schwantes) Schwantes 2405104

(Ruschioideae: 8. Bergeranthus Group).
Schwantes: 180 (1926b); Schwantes: 179 (1926b); Schwantes: 16, 23 (1927d); Herre: 266 (1971); Smith *et al.*: 228 (1998).

Low, compact, densely branched shrublets, or tufted perennials; main roots tuberous. **Leaves** decussate, crowded, slightly connate, sickle-shaped, dull-green and bearing a prominent tooth or hump on lower distal surface (*R. dolabriforme*), or flat, brighter green, white-margined, boat-shaped (*R. rhomboideum*); epidermis ± smooth with superficial stomata, outer epidermal walls thick, with a crystal layer, central water tissue milky-white as in *Hereroa*. **Flowers** 1–3, up to ± 40 mm in diameter, on dichotomously branched, bracteate, long, persistent peduncles; opening in afternoon or evening. **Sepals** 5, subequal, lanceolate. **Petals** ± 3-seriate, linear, yellow, reddish on back towards tips. **Stamens** with glabrous or bearded filaments. **Nectary** of 5 separate crenulate glands. **Ovary** flat on top; placentas parietal; stigmas 5, filiform. **Fruit** a 5-locular capsule, valves with high rims; close to Mitrophyllum type but with bipartite, flat, large closing bodies; locules deep; covering membranes complete with closing ledges at distal lower surfaces; expanding keels mostly basally separate; valve wings very narrow. **Seeds** ovoid, brown to dark brown.

Flowering in spring and early summer.

Distinguishing characters: tufted perennials; leaves sickle- or boat-shaped; fruit with bipartite closing bodies.

Species 5, this eastern Cape genus is practically confined to the subtropical thicket vegetation around Uitenhage and Port Elizabeth, and further afield near Graaff-Reinet in the Great Karoo, an outlying population has been recorded from the southeastern corner of the Northern Cape.

Ruschia Schwantes 2405105

(Ruschioideae: 10. Ruschia Group).
Schwantes: 186 (1926b); Friedrich: 109 (1970); Herre: 268 (1971); Dehn: 91 (1992); Hartmann & Stüber: 1 (1993); Smith *et al.*: 354 (1998).

Shrublets or shrubs with mostly erect, rarely curving or creeping branches, some species with spines, derived from sterile branches of inflorescence; roots woody, rarely tuberous. **Leaves** opposite, free to connate at base to more than halfway, triangular in cross section, flat above and rounded or keeled on lower surface, keel sometimes toothed towards apex; bluish green, usually with darker dots, glabrous or ciliate, rarely papillate on margins. **Flowers** axillary or terminal, solitary to many in inflorescence, usually bracteate, medium-sized. **Sepals** 4 or 5. **Petals** pink to purple, rarely white, 1–several-seriate, sometimes arranged in 5 bundles. **Stamens** arranged in a cone; filaments often hairy at base; staminodes few to many. **Nectary** a continuous, crenulate, dark green ring. **Ovary** ± conical on top; placentas parietal; stigmas 5(6). **Fruit** a 5(6)-locular capsule, of Ruschia type; with a deep base and no valve wings; valves opening into upright position; closing bodies small, hook- hood- or rodlet-shaped, rarely larger and sometimes 0; expanding keels short, widely diverging; additional closing rodlets at distal lower surfaces of covering membranes. **Seeds** variable in shape, yellowish or brownish, smooth to papillate. $x = 9$ (polyploidy).

Flowering throughout the year with peaks in spring and autumn.

Distinguishing characters: mostly shrubby, sometimes creeping perennials; fruit with small hook-shaped closing bodies, short tangentially arranged expanding keels.

Species 224, very wide distribution from near Helmeringhausen in Namibia and eastward in South Africa to Vereeniging in Gauteng and to Harrismith in the Free State, down to the western and southern coasts, also including the mountains of Lesotho.

Ruschianthemum Friedrich 2405106

(Ruschioideae: 12. Eberlanzia Group).
Friedrich: 554 (1960); Friedrich: 121 (1970); Herre: 270 (1971); Smith *et al.*: 362 (1998).

Erect shrubs, up to 1.2 m high, with whitish grey branches. **Leaves** decussate, connate at base, ± club-shaped, ± flat above and keeled towards apex; stomata somewhat sunken or superficial. **Flowers** in rich terminal inflorescence composed of highly branched cymes; small, pedicellate, bracteate. **Sepals** 5, triangular, fleshy, 2 outer the largest. **Petals** ± 1-seriate and ± equal to sepals; short, purple to white. **Stamens** and **staminodes** present, collected in a cone. **Nectary** a crenulate ring. **Ovary** ± convex on top, obtusely 5-lobed; placentas parietal; stigmas 5, short. **Fruit** a capsular schizocarp, 5-locular; turbinate, breaking into nutlets consisting of parts of real and false septum enclosing one seed, with remains of valve wings and expanding keels adhering to it, persistent dorsal and apical connecting bundles forming a fibrous, basket-like skeleton remaining on plant; expanding keels with ornate, rudimentary wings; closing bodies large, filling greater part of locules. **Seeds** 1 or 2 in each locule.

Flowering winter to early spring.

Distinguishing characters: shrubs with club-shaped leaves; mature fruit split into nutlets which break away, leaving behind basket-like remains of the capsules; locules with only 1 or 2 seeds contained in each.

Species 1: *Ruschianthemum gigas* (Dinter) Friedrich, confined to a small area of the winter-rainfall region of the lower Orange River Valley of the Northern Cape and Namibia.

Ruschianthus L.Bolus 2405107

(Ruschioideae: 7. Dracophilus Group).
Bolus: 62 (1961); Friedrich: 121 (1970); Herre: 272 (1971); Smith *et al.*: 230 (1998).

Tufted, compact perennials; rootstock woody or tuberous and old stems covered with dry leaf bases; flowering branches usually with 4 leaves, pale green and finely rough-papillate. **Leaves** falcate, much deeper than broad, flat above, lower surface keeled in upper half and rounded towards base, pinkish grey-green, waxy; epidermis with slightly papillate to ± flat cells, subsidiary cells raised, outer epidermal wall with a thick layer of crystal sand. **Flowers** 1–3-nate, with short peduncle and foliaceous bracts at base; opening around midday, after a few days flowers do not close again. **Sepals** 5, keeled, acuminate, inner ones with narrow, membranous margins; fused at base to form short hypanthium. **Petals**

several-seriate, connate at base, obtuse, not spreading widely due to position of flower amongst leaves, pale lemon-yellow to white. **Stamens** and **staminodes** 8-seriate; anterior filaments without papillae, posterior ones with papillae; petals, stamens and staminodes positioned on thick, swollen, ring-shaped cushion above hypanthium in which copious amounts of nectar accumulate. **Nectary** of 5 slightly separated crenulate glands. **Ovary** obconic, concave from outer rim; placentas parietal; stigmas 5, subulate, incurved. **Fruit** a capsule of Delosperma type; with a slightly raised basal placenta; with narrow valve wings; covering membranes 0; closing bodies 0; stalk elongates as fruit ripens. **Seeds** light brown, oval.

Flowering in winter.

Distinguishing characters: compact perennials with sickle-shaped, smooth leaves; flowers with hypanthium; petals greenish white.

Species 1: *Ruschianthus falcatus* L.Bolus, very restricted area in S Namibia, at the edge of the Namib Desert.

Saphesia N.E.Br. 2405108

(Ruschioideae: 1. Apatesia Group).
Brown: 205 (1932); Herre: 274 (1971); Ihlenfeldt & Gerbaulet: 457 (1990); Van Jaarsveld: 98 (1994b); Smith *et al.*: 76 (1998).

Spreading, glabrous perennial herbs, up to 600 mm wide, 200 mm high; branches procumbent to decumbent, often supported by surrounding vegetation, terete, up to 300 mm long, 3–4 mm in diameter, from a persistent tuberous base; branches, leaves and fruit grey green becoming purplish green with age; older subterranean branches becoming brown, longitudinally fissured; tubers oblong, divided, resprouting after a fire. **Leaves** alternate, crowded and rosulate at base at first, laxly arranged on flowering sideshoots, linear, oblanceolate, 45–160 × 6–10 mm, dorsiventrally flattened, becoming channelled in lower half, ascending, apices bending upwards. **Flowers** solitary, terminal, ± 40 mm in diameter; pedicels slender, 30–90 mm long. **Sepals** 5, unequal. **Petals** 3- or 4-seriate, shorter than sepals, pure white. **Stamens** surrounded by staminodes. **Nectary** a low, crenulate ring. **Ovary**: placentas basal, in shallow locules; stigmas 5, filiform. **Fruit** a 5-locular capsule; opening apically when drying (xerochastic); floor of capsule distally widened to form a covered ring of semipockets. **Seeds** dimorphic, the smaller type probably sterile; compressed horseshoe- to bean-shaped, verrucose, dark brown; dispersal by scattering.

Flowering in spring and early summer.

Distinguishing characters: perennial herbs with tubers; leaves alternate, flat; flowers white; fruit 5-locular, cone-shaped, ends of valves split upon drying and remain so; seeds dimorphic.

Species 1: *Saphesia flaccida* (Jacq.) N.E.Br., in sandy soil on the plains north of Cape Town, from Malmesbury and Clanwilliam districts, Western Cape.

Sceletium N.E.Br. 2405109

(Mesembryanthemoideae).
Brown: 412 (1925); Herre: 276 (1971); Gerbaulet: 9 (1996c); Smith *et al.*: 52 (1998).

Phyllobolus subgen. *Sceletium* (N.E.Br.) Bittrich: 75 (1986); Bittrich: 5 (1986); Hartmann: 47 (1993). *Pentacoilanthus* Rappa & Camarrone: 13 (1962) name invalidly published.

Decumbent or climbing perennials, rarely erect subshrubs; branches slender, basal ones often robust with age; bladder cells of stem and leaves conspicuous or inconspicuous. **Leaves** decussate or becoming alternate in inflorescence, shortly fused towards bases, flat, ± succulent, apex recurved or incurved, veins lignified, dry leaves skeleton-like, persistent and enclosing young buds. **Flowers** in few-flowered dichasia, sometimes solitary, stalked or sessile, 20–40 mm in diameter. **Sepals** 4 or 5(6), persistent. **Petals** white, pale to bright yellow, pale pink, or pale salmon; sepals and petals shortly fused towards bases; rarely stamens and stigmas concealed by staminodes. **Nectary** consisting of 4 or 5 separate grooves. **Ovary** half-inferior; placentas axile; stigmas 4 or 5, acicular. **Fruit** a 4- or 5(6)-locular capsule, of Mesembryanthemum type; expanding keels extending to centre of fruit; valve wings present or 0; breaking off readily to be dispersed by wind as tumble fruit. **Seeds** D-shaped, to 2 mm long, black or brown, with distinct or indistinct crest, surface rough.

Flowering autumn to early summer.

Distinguishing characters: persistent dry leaves which become skeletonised with only veins persisting.

Species 8, occurs in karroid areas of the Northern, Western and Eastern Cape.

Schlechteranthus Schwantes 2405110

(Ruschioideae: 11. Leipoldtia Group).
Schwantes: 16 (1929b); Herre: 278 (1971); Smith *et al.*: 286 (1998).

Dwarf shrubs, up to 400 mm high; branchlets densely leafy, internodes not visible. **Leaves** opposite, united up to half their length into bodies 5 mm long and wide; upper surface flat, keeled on back, usually with 1 or 2 short teeth on keels, mucronate, smooth, glossy with greyish, bluish or reddish colour; stomatal apparatus sunken, overarched by a dome of peristomatal papillae. **Flowers** solitary, subsessile; pedicel bibracteate in middle. **Sepals** 6, unequal. **Petals** 2- or 3-seriate, white, or pink to purple. **Stamens** with surrounding staminodes collected in a central cone; filaments papillate. **Nectary** a crenulate ring. **Ovary** convex on top; placentas parietal; stigmas 10–12, subulate. **Fruit** a 10–12-locular capsule close to Leipoldtia type but with a variable and sometimes complete recurving of covering membranes, with spur-like processes which nearly close opening; expanding keels parallel, diverging towards acute apex; closing bodies present. **Seeds** pear-shaped, somewhat flattened and rough, reddish yellow.

Flowering in winter.

Distinguishing characters: compact perennials, with grey-green short leaves; flowers white or pink to purple, with staminodes collected in a cone.

Species 2, occurs in the Richtersveld, Northern Cape.

Schwantesia Dinter 2405111

(Ruschioideae: 6. Titanopsis Group).
Dinter: 234 (1927); Friedrich: 122 (1970); Herre: 280 (1971); Zimmermann: 81 (1996a); Zimmermann: 257 (1996c); Smith *et al.*: 152 (1998).

Compact, dwarf perennials forming tufts with many branches bearing a cluster of long-lived leaf pairs. **Leaves** opposite, those of a pair dissimilar, ± boat-shaped, keeled, flat or slightly convex on upper surface, often widened towards apex and lobed or toothed on margins, light grey to bluish green; epidermis papillate; outer epidermal wall with a thick crystal layer. **Flowers** solitary, terminal, ± 60 mm in diameter, with ebracteate pedicel up to 50 mm long; opening around mid-afternoon and staying open until nightfall. **Sepals** 5,

unequal. **Petals** 1-seriate, light- to golden-yellow, rarely white. **Stamens** 4-seriate, epapillate. **Nectary** a crenulate, yellowish green ring. **Ovary** convex on top; placentas parietal; stigmas 5, greenish, reflexed towards tips. **Fruit** a 5-locular capsule of Delosperma type; covering membranes vestigial, as narrow ledges spreading from septa, with weak, central column; expanding keels parallel but not touching, yellowish, broadening towards tips; valve wings broad; closing bodies 0. **Seeds** glittering, minutely textured. $x = 9$.

Flowering in autumn.

Distinguishing characters: compact perennials with internodes enclosed by leaves which are asymmetric, toothed, erect, sometimes whitish.

Species 8, occurs in the Northern Cape, from Bushmanland in the east, through the Richtersveld, to the southern parts of Namibia.

Scopelogena L.Bolus 2405112

(Ruschioideae: 9. Lampranthus Group).
Bolus: 9 (1962); Herre: 282 (1971); Smith *et al.*: 338 (1998).

Shrubby perennials forming cushions when old; young stems smooth, bluish green. **Leaves** opposite, fused towards base, erect, terete, semiterete or 3-angled, blunt, to 35 mm long, epidermis smooth. **Flowers** in a many-flowered dichasium, pedicellate, up to 15 mm in diameter. **Sepals** 5, subequal, acute or pointed. **Petals** yellow. **Staminodes** 0. **Nectary** a crenulate ring. **Ovary** with parietal placentas; stigmas 5, filiform, longer than stamens, green. **Fruit** a 5-locular capsule, probably close to Drosanthemum type, woody, top convex; valves once opened do not close again; valve wings 0; expanding keels diverging from base; covering membranes short; closing bodies 0. **Seeds** brown to black, surface rough.

Flowering in early summer.

Distinguishing characters: shrubs with smooth, cylindrical leaves; flowers yellow; fruit without valve wings, covering membranes partially covering locules.

Species 2, restricted to two areas, one near Cape Town and another near Riversdale, Western Cape.

Skiatophytum L.Bolus 2405114

(Ruschioideae: 1. Apatesia Group).
Bolus: 433 (1927); Leistner: 89 (1958); Herre: 286 (1971); Ihlenfeldt & Gerbaulet: 457 (1990); Smith *et al.*: 78 (1998).

Gymnopoma N.E.Br.: 194 (1928d).

Annual or usually perennial herbs with prostrate annual branches from a short, rosette-bearing perennial stem; sometimes suckering from extensive root system. **Leaves** alternate but often apparently opposite on young branches; ± spatulate-lanceolate, up to ± 100 × 20 mm on branches, up to ± 200 × 30 mm in rosette, 2–3 mm thick, soft, smooth, slightly fleshy, margins undulate when young. **Flowers** solitary, with ebracteate pedicel up to 60 mm long, up to ± 45 mm in diameter; opening at noon. **Sepals** 5, unequal. **Petals** in several series, margins papillate, snow-white. **Stamens** and **staminodes** present. **Nectary** a crenulate ring. **Ovary** shortly conical; placentas parietal; stigmas (4)5(–7), subulate, ± as long as stamens. **Fruit** a (4)5–7-locular capsule, large, obconic; valves without expanding keels or marginal wings, with upper distal seed chambers; valves open on drying (xerochastically) and remain open. **Seeds** somewhat kidney-shaped, tuberculate; dispersal as a tumble fruit and by scattering.

Flowering during spring and summer.

Distinguishing characters: annuals or perennials with flat, alternate leaves which have undulated margins when young and may appear opposite; flowers white; capsule valves open upon drying and remain open.

Species 1: *Skiatophytum tripolium* (L.) L.Bolus, only in the SW Western Cape, it has become rare near the Cape Peninsula due to urban expansion.

Smicrostigma N.E.Br. 2405115

(Ruschioideae: 9. Lampranthus Group).
Brown: 72 (1930a); Herre: 288 (1971); Smith *et al.*: 340 (1998).

Low shrublets up to 400 mm high; young stems smooth, succulent, becoming woody with age. **Leaves** decussate, lower parts fused, sheathing stem down to node below, free part deltoid-trigonous, tips recurved; glabrous, up to 13 mm long. **Flowers** solitary, terminal, subsessile, up to 30 mm in diameter, remaining open after first opening. **Sepals** 5, unequal, acuminate. **Petals** white or pink, free towards base. **Staminodes** present, gathered around stamens, pink or purple, rarely white. **Nectary** inconspicuous. **Ovary** ± flat on top; placentas parietal; stigmas 7–10, minute. **Fruit** a 7–10-locular, woody capsule, of Lampranthus type but valves with very narrow wings; expanding keels parallel at base, with diverging awned tips; covering membranes stout; closing bodies 0. **Seeds** brown to black, surface rough.

Flowering spring to summer.

Distinguishing characters: shrubs with stem-sheathing, partially fused leaf pairs; fruit with 7–10 locules.

Species 1, *Smicrostigma viride* (Haw.) N.E.Br. The distribution of *Smicrostigma* stretches from Riversdale in the Western Cape to the Eastern Cape border. It is a typical Little Karoo element found in arid areas north of the Langeberg and Outeniqua Mountains.

Stayneria L.Bolus 2405117

(Ruschioideae: 10. Ruschia Group).
Bolus: 47 (1961); Herre: 292 (1971); Smith *et al.*: 364 (1998).

Erect, stout shrubs up to 800 mm high, with persistent, hardened remains of old leaves on branches, with internodes 30–40 mm long. **Leaves** opposite, connate at base and stem-sheathing, 3-angled, linear-lanceolate, with acute keel, ± 70 × 8 mm; epidermal cells convex, stomata sunken. **Flowers** 3–7 in dichasia on short peduncles, bracteate. **Sepals** 5 or 6, ± equal. **Petals** 1- or 2-seriate, white. **Stamens** with many staminodes; inner filaments papillate up to middle. **Nectary** a ± obscure ring. **Ovary** slightly convex on top; placentas parietal; stigmas (6)7 or 8(9), narrowly subulate. **Fruit** a (6)7 or 8(9)-locular capsule, obconic-globose; close to Ruschia type, but valves connate at base, therefore opening only partially and remaining open; expanding keels contiguous at base, widely diverging, without wings; covering membranes well developed; closing bodies 0. **Seeds** ovate, ± 1 mm long, brown.

Flowering winter to early spring.

Distinguishing characters: erect and woody shrubs with long internodes and stem-sheathing cylindrical leaves with a ridged bottom edge; flowers pink or white with stamens and staminodes collected in a cone; fruit 6–9-locular; once open, remaining so.

Species 1: *Stayneria neilii* (L.Bolus) L.Bolus, confined to the Breede River Valley, Western Cape, from Worcester in the west to McGregor in the east.

Stoeberia Dinter & Schwantes 2405118

(Ruschioideae: 12. Eberlanzia Group).

Schwantes: 14, 17 (1927d); Friedrich: 554 (1960); Friedrich: 128 (1970); Herre: 294 (1971); Van Jaarsveld: 68 (1994a); Hartmann: 29 (1996b); Smith *et al.*: 366 (1998).

Sturdy shrubs, or even trees (Von Breitenbach 1990: 30) up to 3 m tall and 3.5 m wide, usually with a solitary main stem; branches succulent at first, soon becoming woody. **Leaves** decussate, slightly connate at base, boat-shaped or somewhat clavate, with somewhat flattened upper surface and keeled towards apex, mucronate; epidermal cells convex, stomata slightly sunken. **Flowers** many (up to 50), in dense, rounded, compound dichasia, pedicellate, bibracteate; bracts club-shaped. **Sepals** 5 or 6, triangular. **Petals** ± 1-seriate, short, white to light-pink. **Stamens** and **staminodes** papillate at base, in a dense cone. **Nectary** a crenulate ring. **Ovary** top-shaped; placentas parietal; stigmas 5(6), short, slightly plumose. **Fruit** a 5(6)-locular capsule, nearest Ruschia type, top-shaped, upper part domed; valve margins slightly raised in most species; locules deep and wide; valves opening once; valve wings broad, sclerotinised; closing bodies absent or present. **Seeds** flat to pear-shaped and shortly winged; testa cells vaulted, rough; dispersed by wind (anemochoric).

Flowering winter to spring.

Distinguishing characters: shrublets or large bushes; fruit with hard valve wings, and recurved valve rims, not closing completely once they have opened.

Species 5, Namaqualand (Northern Cape) and Namibia.

Stomatium Schwantes 2405119

(Ruschioideae: 5. Stomatium Group).

Schwantes: 175 (1926b); Herre: 296 (1971); Smith *et al.*: 194 (1998).

Compact, small, tufted or clumped perennials, very short-stemmed. **Leaves** opposite, fused to base, often of different length, thick, fleshy, shortly triangular or broadly spatulate, semicylindrical at base, ± keeled towards apex, margins and keel with many small white teeth, rarely not toothed, olive-green to drab grey, often purple when stressed but sometimes permanently reddish or purple. **Flowers** solitary, sessile or with short pedicel, without bracts, with a distinct hypanthium; opening late afternoon or early evening, staying open until ± midnight; scented. **Sepals** 4–6. **Petals** yellow or white. **Stamens** epapillate. **Nectary** usually of 5 distinct crenulate glands, near base of hypanthium. **Ovary** with parietal placentas; stigmas 5(6), clavate, rounded, short. **Fruit** a 5(6)-locular capsule, of Delosperma type; with very narrow rims along septa and with seed pockets derived from basal false septa; locules deep; expanding keels parallel, thick, yellowish, diverging at tips; valve wings narrow or broad; covering membranes vestigial; closing bodies 0. **Seeds** ± 1 mm long, light brown to brown. $x = 9$ (polyploidy).

Flowering early spring to early summer.

Distinguishing characters: small perennial clumps; leaves with many marginal, short teeth; leaf surfaces highly textured.

Species 39, occur in three east-west bands across the arid South African interior. These areas include parts of Namaqualand, Bushmanland and the Great Karoo in the Northern Cape. Further south, species grow in the arid Great Karoo which stretches across the Northern, Western and Eastern Cape. The third area is mostly confined to the central Free State.

Synaptophyllum N.E.Br. 2405120

(Mesembryanthemoideae).

Brown: 412 (1925); Friedrich: 129 (1970); Herre: 298 (1971); Bittrich: 5 (1986); Smith *et al.*: 54 (1998).

Prostrate to decumbent, purple or salmon-red annual herbs; stems herbaceous, branching from base. **Leaves** decussate, sessile, flat, roundish or oval, united at base, forming a scutelliform, amplexicaul dish, upper ones much smaller and free; epidermis smooth or with small bladder cells at margins. **Flowers** in dichasia, up to 15 mm in diameter. **Sepals** 4, unequal, 2 foliaceous, fused into a short tube. **Petals** free at base, white. **Staminodes** 0. **Nectary** consisting of 4 separate narrow grooves. **Ovary** with axile placentas; stigmas 4, subulate. **Fruit** a 4-locular capsule, of Mesembryanthemum type; expanding keels extend to centre of fruit; covering membranes 0; valves with large, erect, incurved wings. **Seeds** up to 0.6 mm long, whitish, surface smooth, crest absent.

Flowering in mid-summer.

Distinguishing characters: paired leaves flat, roundish, stem-clasping; size and shape differences between basal and upper leaves.

Species 1: *Synaptophyllum juttae* (Dinter & A.Berger) N.E.Br., restricted to the fog zone of the southern Namib Desert, near Lüderitz in SW Namibia.

Tanquana H.E.K.Hartmann & Liede 2405160

(Ruschioideae: 6. Titanopsis Group).

Hartmann & Liede: 479 (1986); Smith *et al.*: 128 (1998).

Pleiospilos N.E.Br. in part.

Dwarf, compact, tufted to densely shortly branched perennials, rarely sunken, slightly anisophyllous. **Leaves** opposite, connate at base, thick and firmly fleshy, triangular-boat-shaped, flat to concave above, rounded below; surface bright green to purple, smooth; outer epidermal walls without crystals. **Flowers** solitary, shortly pedicellate, bracteate; opening in afternoon, closing by evening, highly scented. **Sepals** 4 or 5. **Petals** free, slender, yellow. **Stamens** papillate at base. **Nectary** a dark green to yellow, regularly crenate ring. **Ovary** with parietal placentas; stigmas 9 or 10, thread-like. **Fruit** a 9- or 10-locular capsule, of Titanopsis type; convex on top; expanding keels parallel, diverging at tips, ending in aristate valve wings; covering membranes present; closing bodies tiny, endocarpal.

Flowering in autumn.

Distinguishing characters: compact perennials with smooth, unkeeled leaves; fruit 10-locular with tiny closing bodies.

Species 3, occurs in the central part of the Western Cape, it grows in the arid Tanqua Karoo and southwestern Great Karoo, just entering the Little Karoo south of Laingsburg.

Titanopsis Schwantes 2405121

(Ruschioideae: 6. Titanopsis Group).

Schwantes: 178 (1926b); Friedrich: 130 (1970); Herre: 300 (1971); Smith *et al.*: 172 (1998).

Verrucifera N.E.Br.: 278, 513 (1930b).

Dwarf, tufted perennials forming small clumps of densely clustered rosettes usually comprising 3 or 4 leaf pairs, with bases mostly sunken in the ground; rootstock somewhat thickened but occasionally tuberous in old plants. **Leaves** opposite, ± free, spatulate to trigonously clavate, usually with truncate or rounded apex, covered with raised, white, green, copper, pink or reddish cal-

careous pustules, overlying tannin idioblasts, with a thick crystal layer absent in surface depressions. **Flowers** solitary, sessile or shortly pedicellate, ebracteate, up to ± 20 mm in diameter; opening in late afternoon and closing at dusk. **Sepals** 5 or 6, subequal, with pustules as on leaves. **Petals** 1- or 2-seriate, narrow, mostly yellow or amber, but pink or white forms of some species are known, sometimes with a red central stripe. **Stamens** with filaments sometimes bearded. **Nectary** a sometimes crenulate ring. **Ovary** inferior to half- or more superior; placentas basal or parietal; stigmas (5)6(–10), filiform to subulate. **Fruit** a (5)6(–10)-locular capsule, of Titanopsis type; with prominent sutures; expanding keels subcontiguous and diverging towards awn-like apex, minutely toothed on inner, membranous margin; covering membranes membranous, semitransparent, not entirely covering locules; closing bodies 0. **Seeds** many in each locule, subglobose, with small point, minutely tuberculate, pale. $x = 9$ (1 report).

Flowering in winter (western species) and late spring and summer (eastern species).

Distinguishing characters: perennials forming rosettes of highly textured, pustulate, spoon-shaped leaves.

Species 5, distributed in three main areas of sthn Afr., in S Namibia they grow as far north as Lüderitz. To the east, the range straddles the Orange River in a broad north-south belt extending into Bushmanland; in central South Africa, the distribution extends from the Northern Cape into the Free State.

Trichodiadema Schwantes 2405122

(Ruschioideae: 4. Delosperma Group).
Schwantes: 187 (1926b); Friedrich: 133 (1970); Herre: 302 (1971); Ihlenfeldt: 145 (1980); Niesler: 13 (1997); Smith *et al.*: 310 (1998).

Shrubs with long, slender, trailing, arched branches or short-stemmed dwarf shrubs, 30–600 mm high; roots woody or tuberous and clusters of tubers may be present. **Leaves** opposite, slightly connate at base, ± cylindric, up to 30 mm long, usually tipped with a tuft of spreading, bristle-like hairs forming a diadem, surfaces glistening, papillate, bladder cells elevated and pointed at one or both ends. **Flowers** solitary, with short pedicels, up to ± 50 mm in diameter, without bracts. **Sepals** 5–8, papillate, and often with tuft of bristles at tips. **Petals** 1–several-seriate, white, cream, yellow, light to dark pink. **Stamens** and **staminodes** sometimes hairy near base, in a central cone. **Nectary** of 5–8 separate, crenate glands. **Ovary** flat or convex; placentas parietal; stigmas 5–8, lanceolate, much shorter than stamens. **Fruit** a 5–8-locular capsule, of Drosanthemum type; expanding keels contiguous, winged, diverging towards tips; valve wings broad and rounded; covering membranes present or reduced to a limb; closing bodies 0. **Seeds** pear-shaped, minutely warty and grooved, brown or yellowish.

Flowering winter to early summer.

Distinguishing characters: short- or long-stemmed shrubs; leaves crowned with a diadem of bristles; fruit with well-developed covering membranes.

Species 34, widespread in the more arid areas of sthn Afr., in S Namibia, the Richtersveld, Bushmanland and the Great and Little Karoos, in South Africa covering extensive areas in the Northern, Western and Eastern Cape as well as the W Free State.

Vanheerdea L.Bolus ex H.E.K.Hartmann 2405123

(Ruschioideae: 6. Titanopsis Group).
Bolus: 136 (1938b); Herre: 304 (1971); Hartmann: 15 (1992c); Hartmann: 5 (1992c); Smith *et al.*: 198 (1998).

Rimaria N.E.Br.: 134 (1926b) illegitimate name; Bolus: 66 (1937).

Compact, dwarf perennials, forming dense clumps with up to ± 40 very short branches each bearing a pair of leaves in the dry season; plants sometimes almost completely sunken into the ground; rootstock deep. **Leaves** opposite, united at base and pressed together forming subglobose or ovoid bodies, sometimes keeled or with windowed tips (*V. primosii*), glabrous (*V. primosii*) or minutely puberulous (*V. roodiae*); margins and keels with short, stout teeth; characteristically light yellowish green, sometimes tinged with red or entirely flushed with purple. **Flowers** solitary or up to 3 together from between leaves, shortly pedicellate, bibracteate, up to 50 mm in diameter; opening in afternoon, closing at night; strongly scented. **Sepals** 5–9, unequal, with rounded apices. **Petals** ± 3-seriate, orange-yellow to yellow. **Stamens**: filaments of inner ones papillate. **Nectary** a crenulate ring. **Ovary** slightly convex on top; placentas parietal or basal; stigmas 7–15, filiform, papillate. **Fruit** a 7–15-locular capsule, of Titanopsis type; conical, not closing entirely after seeds have been released; expanding keels ± diverging, fringed with broad membranous valve wings; covering membranes with flat, flexible membranous wings; closing bodies 0. **Seeds** many in each locule, subglobose, smooth, brown. $x = 9$ (polyploidy).

Flowering late winter.

Distinguishing characters: compact perennials; leaf pairs often forming bodies; leaves thick, yellowish green, with short, stout teeth on margins and keel; flowers single or up to three together, yellowish orange.

Species 2, Bushmanland, Northern Cape.

Vanzijlia L.Bolus 2405124

(Ruschioideae: 11. Leipoldtia Group).
Bolus: 262 (1927i); Herre: 306 (1971); Hartmann: 85 (1982b); Hartmann: 499 (1983b); Smith *et al.*: 378 (1998).

Low, glabrous perennials with many short shoots forming compact clumps with several long shoots which may be trailing. **Leaves** opposite, leaf pairs dimorphic: leaf pairs on short shoots and first leaf pair on long shoots fused into long sheaths with only short free tips, less connate leaf pairs with pointed free leaf portions on long shoots; without tannin idioblasts (a rare condition in Ruschioideae), stomata not sunken. **Flowers** solitary, pedicellate or sessile, bracteate, up to ± 60 mm in diameter. **Sepals** 5. **Petals** 2-seriate, white. **Stamens** with 2 or 3 series of papillate, pink or purple staminodes; surrounding stamens in a cone, distinctly elongating during anthesis. **Nectary** a crenulate ring. **Ovary** flattish on top; placentas parietal; stigmas 10, subulate. **Fruit** a 10-locular capsule of Leipoldtia type, with additional closing devices such as inconspicuous ledges or bulges; expanding keels diverging, with wings; covering membranes present; closing bodies present, large, white. **Seeds** smooth. $x = 9$ (polyploidy).

Flowering winter to early spring.

Distinguishing characters: compact perennial clumps with trailing or climbing long shoots; leaf pairs dimorphic; flowers with distinctly elongating filamentous staminodes.

Species 1: *Vanzijlia annulata* (A.Berger) L.Bolus, western coast of the Northern and Western Cape, with an extension inland into the Knersvlakte.

Vlokia S.A.Hammer 2405185

(Ruschioideae: 9. Lampranthus Group).
Hammer: 255 (1994b); Smith *et al.*: 130 (1998).

Dwarf, tufted perennials, sparsely branched, with age forming prostrate stems up to 100 mm long, ± 4 mm thick; internodes 2–5 mm long, old leaves persisting for 8–10 years, shrunken but retaining their shape; roots wiry, thin, brownish, running laterally to 300 mm. **Leaves** of the current season opposite, basally connate, ± equal, ± 10 mm long, 8 mm broad, 8 mm thick, boat-shaped, keeled, firm, greyish green to brownish green, glabrous, slightly shining when turgid, very smooth, with a thin wax layer, finely and vaguely maculate, margins slightly reddened. **Flowers** solitary; pedicel up to 6 mm long, 2–2.5 mm thick, pale green with a reddish flush; bracts shaped like leaves but half their size; diurnal, expanding at noon, closing by late afternoon; scentless. **Sepals** 6, equal, reddish green with thin translucent margins. **Petals** 22–25 in a single series or with a second partial series, 4–5 mm long, to 1.5 mm broad, often obtuse, not widely spreading, mauve to rose-pink. **Stamens** sparse, ± 16, shorter than staminodes, papillate; anthers whitish yellow; staminodes conically collected, up to 80, up to 4 mm long, recurved above, pink or white. **Nectary** composed of ± 20 dark green, contiguous tiny glands forming a ring. **Ovary** with basal-parietal placentas; stigmas (5)6(7), concealed within staminal cone, up to 2 mm long, free, pale green. **Fruit** a 5–7-locular capsule of ± Lampranthus type, up to 6 mm in diameter (up to 10 mm when expanded), firm, blackish, flat above, half globose below; expanding keels parallel at base, divergent towards tips; covering membranes present, flat; closing bodies 0; valve wings 0. **Seeds** ± 20 per locule, fattish-pyriform, very finely rugulose, dark brown.

Flowering late winter to early spring.

Distinguishing characters: perennials with persistent trailing stems; old persistent leaves blackish; capsules blackish.

Species 1, only a few populations on a mountain near Montagu in the western Little Karoo of the Western Cape.

Wooleya L.Bolus 2405125

(Ruschioideae: 9. Lampranthus Group).
Bolus: 48 (1961); Herre: 308 (1971); Smith *et al.*: 342 (1998).

Moderately branched sprawling shrubs, up to 200 mm high; young branches and leaves ash-grey to purplish becoming grey-brown; woody stems up to 10 mm in diameter; roots fibrous. **Leaves** opposite, fused towards base, erect or spreading, obscurely 3-angled to cylindrical with upper surface slightly flattened, lower surface convex, blunt, up to 35 mm long, 9 mm in diameter, appearing as if dusted with powder, ash-grey to purplish, keels and margins reduced to red lines and tip ending in a point. **Flowers** solitary, terminal, shortly pedicellate, bracteate; opening in morning, closing in evening. **Sepals** 4, unequal, outer ones rounded and inner ones without membranous margins. **Petals** free towards base, white. **Stamens** papillose in basal part; staminodes gathered in a cone around stamens. **Nectary** consisting of a series of small teeth in a continuous ring. **Ovary** concave around margin, conical in centre above; placentas parietal; stigmas 11 or 12, subulate. **Fruit** a 11- or 12-locular capsule of Lampranthus type, woody, reddish at first, convex on top; valves with spreading wings; expanding keels parallel at base, diverging slightly towards apex; covering membranes small, not covering entire locule; closing bodies 0. **Seeds** smooth.

Flowering March to August in habitat.

Distinguishing characters: robust sprawling plants with leaves seemingly dusted with flour (hence the specific name *farinosa* = floury); flowers solitary, white; fruit 11- or 12-locular.

Species 1: *Wooleya farinosa* (L.Bolus) L.Bolus, restricted to the coastal plains of Namaqualand, Northern Cape.

Zeuktophyllum N.E.Br. 2405126

(Ruschioideae: 6. Titanopsis Group).
Brown: 12 (1927a); Herre: 310 (1971); Smith *et al.*: 288 (1998).

Sturdy dwarf shrublets, up to 100 mm high with woody stems and 3 or 4 leaf pairs per branch; roots fibrous. **Leaves** decussate, fused towards base, ascending, 3-angled, tapering, up to 30 mm long; epidermis smooth. **Flowers** solitary, terminal, shortly pedicellate, bracteate. **Sepals** 4, unequal. **Petals** free towards bases, white. **Staminodes** present. **Nectary** a series of small teeth in a continuous ring. **Ovary** with parietal placentas; stigmas 10, subulate. **Fruit** a 10-locular capsule of Lampranthus type, woody, top flat, expanding keels divergent, ending with a small stiff, aristate wing, covering membranes present, closing bodies 0. **Seeds** muricate.

Flowering in summer.

Distinguishing characters: compact shrublets with partially fused leaves; flowers solitary with short pedicels; fruit flat-topped, 10-locular.

Species 2. On quartzitic slopes in the vicinities of Ladismith and Laingsburg, Western Cape.

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Molluginaceae

(Caryophyllidae—Caryophyllales)

Compiled by L.L. Dreyer & M. Jordaan

Annual or perennial herbs or subshrubs, scarcely or nonsucculent, glabrous, or rarely with stellate or glandular hairs, branching monopodially or often sympodially; containing anthocyanin pigments. **Leaves** alternate or rarely opposite, often crowded into basal rosettes and false whorls on stem, simple, entire; stipules membranous or 0. **Inflorescence** mostly terminal or in seemingly, rarely truly, axillary cymes, or solitary. **Flowers** bisexual, regular, hypogynous, very rarely perigynous, sessile or pedicellate, mostly inconspicuous, usually greenish white, sometimes pink or red. **Sepals** (4)5, free or rarely connate (*Coelanthum*), imbricate or quincuncial, persistent, membranous. **Petals** 0 or 5–many

(small, staminodial in origin). **Stamens** (3)4 or 5(–many), alternisepalous, or if more than 5, in alterni- and episepalous whorls, hypogynous; filaments ± free, but usually connate at base, forming very short cupular tube; anthers tetrasporangiate, dehiscing by longitudinal slits. **Ovary** superior, (1)2–5-carpellate and with as many locules as carpels; styles or sessile stigmas as many as carpels, free or rarely united at base; placentation axile, but seemingly basal in some uniovulate carpels; ovules 1–many per locule, anatropous to anacampylotropous, bitegmic. **Fruit** a loculicidally dehiscent capsule, rarely separating into 2 indehiscent mericarps or a nutlet, often with persistent calyx. **Seeds** generally reniform, sometimes with a small funicular aril; embryo peripheral, curving around hard, starchy perisperm; endosperm scanty or 0.

Genera ± 16, species ± 120, distributed primarily in the tropics and subtropics of both hemispheres with a centre of diversity in sthn Afr.; sthn Afr.: genera 11, species 90, widespread.

Hutchinson: 128 (1926); Pax & Hoffmann: 179 (1934) as Aizoaceae; Adamson: 83 (1955); Adamson: 11 (1958); Adamson: 51 (1959); Adamson: 125 (1961); Jeffrey: 1 (1961); Friedrich: 1 (1966); Boglc: 431 (1970); Gonçalves: 522 (1978) as Molluginaceae; Endress & Bittrich: 419 (1993); Gilbert: 106 (1993); Eliasson: 5 (1996).

The Molluginaceae is floristically very similar to the Aizoaceae and the Phytolaccaceae, and is either included in the Aizoaceae or accommodated partially in the Aizoaceae and partially in the Phytolaccaceae in most earlier treatments. In more recent classification systems (Endress & Bittrich 1993; Gilbert 1993; Takhtajan 1997), the Molluginaceae is usually treated as a separate family, based on the presence of anthocyanins and absence of betalains, the structure of the androecium and calyx, the funicle length, and the epidermis of the leaves and stems.

Key to genera

1a Flowers with petals:
2a Petals inconspicuous, composed of few to ± 20 linear, strap-like filaments divided at the apex; the plants usually stellate-pubescent; seeds with a filiform aril ..... **Glinus**
2b Petals conspicuous, 5–many; plants glabrous or glandular-hairy; aril 0, or if present not filiform:
3a Petals 15–220, delicate; stamens 10–many; plants glabrous; ovules many per locule ..... **Corbichonia**
3b Petals 5; stamens fewer; plants glabrous or glandular-hairy; ovules 1 per locule ..... **Limeum**
1b Flowers without petals:
4a Sepals 5, fused for at least half their length, greenish white; stamens 5, alternisepalous; ovary 3-locular with many ovules per locule ..... **Coelanthum**
4b Sepals (4)5, completely free or only united slightly at base, often with membranous edges and coloured within; ovary 1–7-locular, ovules 1–many:
5a Ovary 1-locular with 1 ovule; style often asymmetrical; fruit a nutlet ..... **Adenogramma**
5b Ovary 2–7-locular; fruit dehiscent:
6a Ovary 2-locular:
7a Sepals entire, with membranous edges; stamens (5–)7(–10); stipules 0; fruit splitting into 2 woody, sometimes winged mericarps ..... **Limeum**
7b Sepals white, laciniate-fimbriate; stamens 4 or 5, far-exserted; stipules present, large and fimbriate; fruit membranous, splitting loculicidally down to base ..... **Polpoda**
6b Ovary 3–7-locular:
8a Stipules conspicuous, mostly laciniate or adnate to leaf base:
9a Stipules entire, membranous, adnate to dilated leaf base, amplexicaul; inflorescence a long-pedunculate umbel-like thyrse; leaves glaucous, fleshy; stamens few to ± 30 ..... **Hypertelis**
9b Stipules usually fimbriate-laciniate, membranous, whitish, not adnate to leaf base; leaves not fleshy; stamens (3–)5:
10a Ovules 1 per locule ..... **Psammotropha**
10b Ovules many per locule:
11a Sepals hooded at apex, with conspicuous dorsal spine; hypogynous disc 0; leaves needle-like..... **Suessenguthiella**
11b Sepals neither hooded nor with dorsal spine; ± 3–5-lobed hypogynous disc present between ovary and stamens; leaves filiform or linear (rarely broader), usually aristate ..... **Pharnaceum**
8b Stipules small or 0:
12a Plants usually stellate-pubescent (rarely glabrous); leaves without stipules; stamens 3–many; ovules many per locule; seeds with a long filiform aril ..... **Glinus**
12b Plants not pubescent; stipules small or 0; stamens 3–10; seeds exarillate:
13a Perennials, either small subshrubs or cushion plants; leaves narrowly linear, subulate or ericoid, rigid; stamens 5; ovules 1 per locule ..... **Psammotropha**
13b Annual herbs or glabrous subshrubs; leaves linear to spathulate; stamens (3–)5(–10); ovules many per locule:
14a Flowers with 3–5-lobed hypogynous disc between stamens and ovary ..... **Pharnaceum**
14b Flowers without hypogynous disc ..... **Mollugo**

Adenogramma Rchb. 2374000

Reichenbach: 3, t. 109 (1828); Sonder: 149 (1860); Adamson: 83 (1955); Friedrich: 3 (1966); Endress & Bittrich: 424 (1993).

Steudelia C.Presl: 1 (1829b); Presl: 3 (1830).

Annual or perennial, prostrate or sprawling herbs. **Leaves** linear, bristle-tipped, in false whorls; stipules filiform, membranous. **Inflorescence** a sessile, seemingly axillary cyme. **Flowers** small. **Sepals** 5, white with a green midrib, ± cucullate. **Petals** 0. **Stamens** 5. **Ovary** 1-locular; ovules 1 per locule; style often asymmetrical; stigma capitate. **Fruit** a nutlet, usually laterally compressed.

Species ± 10, confined to sthn Afr., from Namaqualand (Northern Cape) to the Western Cape.

Coelanthum E.Mey. ex Fenzl 2391000

Fenzl: 353 (1836); Sonder: 147 (1860); Adamson: 48 (1958a); Friedrich: 3 (1966); Endress & Bittrich: 425 (1993).

Annual herbs with scape-like, dichotomously branching stems. **Leaves** lanceolate or elliptic, in basal rosette and in false whorls on stem; stipules membranous, fimbriate-laciniate. **Flowers** small, in lax terminal cymes. **Sepals** 5, fused to ± halfway, lobes with membranous margins, greenish white. **Petals** 0. **Stamens** 5, arising in mouth of perianth tube, alternisepalous. **Ovary** 3-locular; ovules many per locule; styles 3, linear, papillose. **Fruit** a capsule, included in calyx, membranous or chartaceous, loculicidally 3-valved, many-seeded. **Seeds** subglobose, acute, reticulated.

Species 3, endemic to sthn Afr., western coastal belt of Namibia and the Western Cape.

Corbichonia Scop. 2393000

Scopoli: 264 (1777); Pax & Hoffmann: 192 (1934); Adamson: 67 (1958b); Jeffrey: 9 (1961); Friedrich: 4 (1966); Gonçalves: 533 (1978); Endress & Bittrich: 424 (1993); Gilbert: 109 (1993).

Orygia Forssk.: 103 (1775) in part; Sonder: 136 (1860).

Glabrous perennial herbs or subshrubs with prostrate stems, woody at base. **Leaves** alternate, slightly fleshy, obovate to rotund, apiculate; stipules 0. **Inflorescences** lax, terminal or seemingly leaf-opposed cymes. **Flowers** pedicellate. **Sepals** 5, free, ovate, cuspidate, with membranous margins, pink, mauve, magenta or red. **Petals** many, slender. **Stamens** 10–30. **Ovary** 5-locular; ovules many per locule; styles 5, free, sessile, linear, spreading. **Fruit** a loculicidal, 5-valved capsule included in calyx. **Seeds** many, subreniform, ridged, with small strophiole.

Species 2, Africa to SW Asia; 2 in sthn Afr.: *Corbichonia decumbens* (Forssk.) Exell and *C. rubriviolacea* (Friedrich) Jeffrey, Namibia, Botswana, Northern Province, North-West, Mpumalanga, Gauteng, Swaziland, KwaZulu-Natal, Northern and Eastern Cape.

Glinus L. 2388000

Linnaeus: 463 (1753); Linnaeus: 208 (1754); Sonder: 136 (1860); Hutchinson & Dalziel: 114 (1927); Keay: 135 (1954); Adamson: 125 (1961); Jeffrey: 11 (1961); Pitot: 769 (1965); Friedrich: 6 (1966); Bogle: 441 (1970); Gonçalves: 537 (1978); Endress & Bittrich: 424 (1993); Gilbert: 110 (1993); Eliasson: 6 (1996).

Much-branched annual herbs, often forming mats, usually simply or stellately pubescent (rarely ± glabrous). **Leaves** alternate or in false whorls, narrowly elliptic to ovate, ± fleshy; stipules 0. **Inflorescence** a dense, sessile to short-pedunculate, seemingly axillary cyme. **Flowers** few to many. **Sepals** 5, free, often yellowish on inner surface, margins hyaline, tip mucronate, persistent. **Petals** 0–8(–20), usually splitting at apex. **Stamens** 3–20, alternate with and shorter than sepals, hypogynous; filaments filiform; anthers versatile. **Ovary** 3–5-locular; ovules many per locule, anacampylotropous; styles 0; stigmas 3(–5), sessile, of hyaline papillae, persistent. **Fruit** an ovoid, loculicidal capsule. **Seeds** many, reniform, granular or smooth, with a long filiform aril; cotyledons oblong, fleshy; endosperm starchy. $x = 9$.

Species ± 13, pantropical with 2 species reaching temperate regions as introduced weeds; 3 in sthn Afr., natural and widespread, Namibia, Botswana, Northern Province, Mpumalanga, Free State, Swaziland, KwaZulu-Natal and Northern Cape; **Glinus lotoides* L. var. *lotoides*, widespread as a naturalised weed.

Hypertelis E.Mey. ex Fenzl 2390000

Fenzl: 352 (1836); Sonder: 144 (1860); Pax & Hoffmann: 227 (1934); Adamson: 51 (1958a); Jeffrey: 18 (1961); Friedrich: 7 (1966); Gonçalves: 546 (1978); Endress & Bittrich: 424 (1993).

Glaucous, annual or perennial herbs or subshrubs. **Leaves** alternate or in false whorls, filiform, terete, ± fleshy; stipules entire, membranous, adnate to leaf base, forming dilated, amplexicaul sheath. **Inflorescences** terminal or seemingly axillary umbel-like thyrses with long peduncles. **Sepals** 5, whitish or pink. **Petals** 0. **Stamens** (3–)5–15(–many). **Ovary** 3–5-locular; ovules many per locule; stigmas 3–5, short. **Fruit** a membranous, loculicidal, 3–5-valved capsule. **Seeds** triangular in outline, smooth. $x = 8$.

Species 9, basically a sthn Afr. genus, with 1 species extending to tropical Africa and Madagascar and 1 endemic to St Helena; 8 in sthn Afr., widespread in all regions except Lesotho.

Limeum L. 2376000

Linnaeus: 994 (1759); Sonder: 152 (1860); Hutchinson & Dalziel: 113 (1927); Phillips: 283 (1951); Keay: 134 (1954); Friedrich: 133 (1956); Jeffrey: 6 (1961); Friedrich: 9 (1966); Gonçalves: 525 (1978); Endress & Bittrich: 419 (1993); Gilbert: 107 (1993).

Annual or perennial herbs or subshrubs, glabrous or with glandular hairs. **Leaves** alternate to subopposite, linear, subulate, lanceolate or orbicular; stipules 0. **Inflorescence** cymose, lax or glomerulate. **Flowers** small. **Sepals** 5, greenish or whitish. **Petals** 0 or 5, adnate to staminal tube, whitish. **Stamens** (5–)7(–10); filaments broadened below. **Ovary** pseudomonomerous, 2-locular; ovule 1 per locule; style 1; stigmas 2. **Fruit** separating into two woody indehiscent mericarps; mericarps 1-seeded, suborbicular or reniform, often auricled at base, outer surface reticulate, rugose, ridged, spinescent or smooth, wingless or sometimes broadly membranous-winged. $x = 9$.

Species ± 26, mostly in sthn Afr., with a few species reappearing in the Sudan, Ethiopia and S Asia; 18 in sthn Afr., widespread.

Mollugo L. 2387000

Linnaeus: 89 (1753); Linnaeus: 39 (1754); Fenzl: 375 (1836); Sonder: 137 (1860); Hutchinson & Dalziel: 114 (1927); Phillips: 290 (1951); Keay: 134 (1954); Adamson: 13 (1958a); Jeffrey: 16 (1961); Pitot: 751 (1965); Friedrich: 15 (1966); Bogle: 437 (1970); Gonçalves: 318 (1970); Gonçalves: 541 (1978); Endress & Bittrich: 424 (1993); Gilbert: 110 (1993); Eliasson: 9 (1996).

Annual herbs, glabrous; stems prostrate, decumbent or erect, with slightly swollen nodes. **Leaves**: basal leaves crowded into a rosette, other leaves in false whorls on stem, linear to spathulate, sometimes slightly fleshy; stipules small and scarious or 0. **Inflorescences** axillary or terminal, umbellate or dichotomous cymes; flowers inconspicuous; pedicels short, strongly reflexed after flowering. **Sepals** 5, free, imbricate, green without, whitish within, margins hyaline. **Petals** 0. **Stamens** (3–)5(–10), alternating with carpels or sepals, united basally by a very shallow ring of filament tissue; anthers versatile. **Ovary** 3–5(–8)-locular; ovules many per locule; styles 3(–5), free, very short, erect; stigma linear, papillate. **Fruit** a membranous, ellipsoidal, loculicidal capsule, longer than and included within persistent sepals. **Seeds** many, ± compressed, reniform to roundish, reddish to blackish brown; embryo curved; cotyledons oblong, fleshy. $x = 9$ (polyploidy).

Species ± 30, tropics and subtropics of both hemispheres, with a few species widespread as introduced weeds in temperate regions; 6 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Mpumalanga, Gauteng, Swaziland, Free State, N KwaZulu-Natal, Lesotho and Northern Cape.

Pharnaceum L. 2389000

Linnaeus: 272 (1753); Linnaeus: (1754); Sonder: 138 (1860); Pax & Hoffmann: 227 (1934); Phillips: 290 (1951); Adamson: 19 (1958a); Fricdrich: 17 (1966); Ross: 161 (1972); Gonçalves: 544 (1978); Endress & Bittrich: 425 (1993).

Slender subshrubs or herbs. **Leaves** alternate or crowded into false whorls, filiform or linear, rarely lanceolate or elliptic; stipules membranous, fimbriate-laciniate. **Inflorescence** a terminal umbel-like thyrse. **Sepals** 5, free or sometimes connate at base, usually coloured on inner surface. **Petals** 0. **Stamens** (3–)5, alternating with sepals. **Nectariferous disc** normally present, 3–5-lobed. **Ovary** 3–5-locular; ovules many per locule. **Fruit** a membranous, loculicidal, 3–5-valved capsule. **Seeds** globose-lenticular with a thin dorsal ridge, without appendage at apex of funicle; testa glossy brown, finely granular.

Species ± 25, Africa; 25 in sthn Afr., Namibia, Northern Province, Gauteng, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

Polpoda C.Presl 2375000

Presl: 1 (1829a); Presl: t. 1 (1830); Sonder: 148 (1860); Phillips: 283 (1951); Adamson: 93 (1955); Endress & Bittrich: 425 (1993).

Small subshrubs. **Leaves** alternate, oblong-linear or ovate, ericoid, acute or mucronate, densely imbricate on branches; stipules large, membranous, fimbriate, adnate to base. **Flowers** in 1–few-flowered axillary cymes along stem, small, sessile, closely surrounded by appressed stipules. **Sepals** 4(5), hyaline, fimbriate, white. **Petals** 0. **Stamens** 4(5); filaments far exserted. **Ovary** 2-locular; ovules 1 per locule; styles 2. **Fruit** a membranous, compressed, loculicidal capsule.

Species 2, endemic to sthn Afr.: *Polpoda capensis* C.Presl and *P. stipulacea* (F.M.Leight.) Adamson, Western Cape.

Psammotropha Eckl. & Zeyh. 2379000

Ecklon & Zeyher: 286 (1836); Sonder: 146 (1860); Phillips: 284 (1951); Adamson: 51 (1959); Jeffrey: 11 (1961); Gonçalves: 535 (1978); Endress & Bittrich: 419 (1993).

Perennial subshrubs or cushion plants. **Leaves** alternate or in false whorls on stem, linear, subulate or ericoid, often crowded into basal rosette; stipules small and scarious, lacerate or 0. **Inflorescence** a terminal or seemingly axillary, umbellate to glomerulate cyme. **Flowers** small. **Sepals** 5, herbaceous, free, green, with membranous margins. **Petals** 0. **Stamens** 5. **Ovary** 3–5-locular; ovules 1 per locule; placentation basal; stigmas 3 or 5, ± free. **Fruit** a chartaceous, loculicidal capsule. **Seeds** granular.

Species ± 11, mostly confined to sthn Afr., but with 2 extending further north, 1 into tropical Africa; 11 in sthn Afr., Northern Province, North-West, Mpumalanga, Gauteng, Swaziland, Free State, KwaZulu-Natal, Eastern and Western Cape.

Suessenguthiella Friedrich 2389010

Friedrich: 60 (1955); Friedrich: 20 (1966); Endress & Bittrich: 425 (1993).

Annual or perennial herbs. **Leaves** in basal rosette and in false whorls on stem, needle-like; stipules membranous, whitish, fimbriate-laciniate. **Inflorescence** a subsessile, seemingly axillary glomerule. **Sepals** 5, hooded at apex, with subapical, recurved, dorsal spine. **Petals** 0. **Stamens** 5. **Ovary** 3-locular; ovules many per locule. **Fruit** a membranous, loculicidal capsule.

Species 2, endemic to sthn Afr.: *Suessenguthiella caespitosa* Friedrich and *S. scleranthoides* (Sond.) Friedrich, Namibia and Northern Cape.

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Monimiaceae

(Magnoliidae—Magnoliales)

Compiled by M. Jordaan

Evergreen trees or shrubs, glabrous, often aromatic, dioecious. **Leaves** opposite or subopposite, simple, coriaceous, entire or irregularly, minutely glandular-toothed, gland-dotted; stipules 0. **Inflorescence** solitary or paired, velvety pubescent racemes or cymes in axils of upper leaves; bracts small or 0. **Flowers** unisexual, ± regular, small. **Perianth** of 3–6 inconspicuous tepals, imbricate. **Male flowers** with small flat receptacle; tepals 4–6, ovate or lanceolate; stamens 10–15; filaments short, without appendages; anthers subsessile, dehiscing by 2 slits; rudimentary ovary 0. **Female flowers** with 3–5 tepals; staminodes 0 or hair-like; ovary superior, unicarpellate, obovoid, glabrous, a ring of hairs around its base, 1-locular; ovule solitary, pendulous, anatropous; stigma thick, sessile, discoid or cushion-shaped. **Fruit** a 1-seeded drupe, ovoid, smooth, often enclosed by perianth or in a fleshy receptacle, with persistent stigma. **Seed** compressed, ellipsoid; endosperm copious, oily; embryo straight.

Genera ± 34, species ± 440; mainly in the warmer parts of the southern hemisphere in Africa, New Guinea and Australia, also South and Central America; sthn Afr.: genus 1, species 1.

Jussieu: 133 (1809); Pax: 94 (1891); Airy Shaw: 756 (1973); Thorne: 147 (1974); Takhtajan: 225 (1980); Phillipson: 25 (1987); Phillipson: 426 (1993).

The genus *Xymalos* was included in the family Trimeniaceae by Gibbs (1917), Hutchinson (1973) and Dyer (1975). Baker & Wright (1909), Wright (1912) and Phillips (1951), Melchior (1964), Verdcourt (1968), Airy Shaw (1973), and Phillipson (1993) placed the genus in the family Monimiaceae (Jussieu 1809), and they are followed in this work. Takhtajan (1997) and Phillipson (1987, 1993) place *Xymalos* in subfamily Mollinedioideae (Perkins) Thorne (1974) tribe Hedycaryeae Pax (1891) of Monimiaceae.

Xymalos Baill. 2759010

Baillon: 650 (1887); Baker & Wright: 169 (1909); Wright: 492 (1912); Verdcourt: 1 (1968); Phillipson: 434 (1993); Stannard: 42 (1997).

Description as for family.

Monotypic, East Africa from Sudan to sthn Afr.: *Xymalos monospora* (Harv.) Baill., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape forests.

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Montiniaceae

(Rosidae—Rosales)

Compiled by M. Jordaan

Shrubs or shrublets, sometimes small trees, with furrowed branches and distinct lenticels; plants dioecious. **Leaves** alternate, simple, entire, penninerved, shortly petiolate, ± glabrous, coriaceous, elliptic or lanceolate, deciduous; stipules 0. **Flowers** unisexual, regular, small. **Male flowers** in few-flowered, terminal corymbs; calyx tube expanded, shortly 4-lobed, persistent; petals 4, free, fleshy, rounded, imbricate, deciduous, white; stamens 4, inserted under margin of disc, alternating with petals; filaments linear, shorter than the oblong, extrorse anthers; disc basin-shaped, large, yellow-green; ovary 0 or rudimentary. **Female flowers** solitary or in groups of 2(3); calyx tube fusiform, adnate to ovary, very shortly 4-toothed; petals as in male; staminodes 0 or rudimentary; disc epigynous, somewhat fleshy, 4-angled; ovary inferior, 2-carpellate, imperfectly 2-locular, ellipsoid; placentas 2, axile, each placenta with up to 12 ovules in 2 longitudinal series; style short, thick, 2-branched from middle, each branch ending in a large, horseshoe-shaped stigma. **Fruit** a 1-locular, subwoody, ellipsoid capsule, crowned by persistent calyx lobes, disc and style, opening by 2 valves, with seeds on the 2 free-central, somewhat fleshy placentas. **Seeds** flat, winged, arranged on each placenta in 2 rows like rooftiles; testa pustulate; endosperm 0; embryo straight; cotyledons broadly oblong. $x = 17$.

Genera 2, species ± 4, eastern tropical and sthn Afr. as well as Madagascar; sthn Afr.: genus 1, species 1.

Candolle: 35 (1828) as Onagrarieae tribe Montinieae; Hooker: 785 (1867) as Onagrarieae; Engler: 223 (1928) as Saxifragaceae subfamily Montinioideae; Milne-Redhead: tt. 3541–3544 (1955) as Montiniaceae; Mendes: 54 (1978).

Montinia Thunb. 3238000

Thunberg: 108 (1777); Jussieu: 318 (1789); Smith: 14, t. 15 (1792); Candolle: 35 (1828); Harvey: 307 (1862); Hooker: 794 (1867); Engler: 223 (1928); Adamson: 440 (1950); Milne-Redhead: tt. 3541–3544 (1955); Friedrich-Holzhammer: 1 (1967); Mendes: 54 (1978).

Description as for family.

Monotypic: *Montinia caryophyllacea* Thunb., SW Angola; Namibia, Botswana, Northern, Western and Eastern Cape.

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Moraceae

(Hamamelidae—Urticales)

Compiled by M. Jordaan

Trees, shrubs or climbers, with milky or sometimes watery latex; monoecious or dioecious. **Leaves** alternate (spirally or distichous), rarely some opposite, simple, entire or sometimes dentate, 3-nerved, pinnately or palmately veined; stipules present, often conspicuous. **Flowers** unisexual, in dense, globose heads or enclosed in a syconium or 'fig'. **Perianth** of 2–6, free, persistent tepals or 2–6-lobed or -toothed, or tubular, or 0, valvate or imbricate. **Male flowers** with (1–)4(–6) stamens, with straight or reflexed, free or connate filaments; pistillode present or 0. **Female flowers** without rudiments of stamens; ovary 1-locular, superior to inferior; ovule solitary, anatropous or campylotropous, pendulous from apex of locule, rarely basal and erect; styles 2, equal or unequal, subulate or filiform, or style entire or bifid at apex. **Fruit** either compound and globose or ellipsoid and formed from the enlarged, fleshy perianth segments and outer coat of ovary, or of achenes, immersed or not in a flattened receptacle, or enclosed in a globose or pear-shaped fleshy syconium or 'fig'. **Seeds** either large, without endosperm, or small with endosperm.

Genera ± 50; species ± 1200, cosmopolitan, mainly tropical with ± 625 in Asia and Australia, ± 300 species in the Neotropics, and ± 200 species in the African region; sthn Afr.: genera 4, species 29 (excluding exotics).

Endlicher: 33 (1847); Lindley: 266 (1847); Bureau: 211 (1873); Bentham: 357 (1880); Engler: 66 (1889); Engler: 1 (1898); Corner: 187 (1962); Berg: 1 (1973); Rohwer: 438 (1993).

Key to genera

1a Plants without spines; bracts and tepals without yellow glands:
  2a Flowers in a completely closed or open receptacle:
    3a Receptacle campanulate or obconic, wide open at the top; flowers exserted ..... **Trilepisium**
    3b Receptacle mostly fleshy, hollow, globose or obovoid, closed at the top except for a small ostiole ..... **Ficus**
  2b Flowers in dense, globose heads, spikes or catkins ..... **Morus**
1b Plants with curved or straight spines; bracts and/or tepals usually with immersed glands accumulating a yellow dye .... **Maclura**

Ficus L. 1961000

Linnaeus: 1059 (1753); Linnaeus: 482 (1754); Adanson: 377 (1763); Jussieu: 400 (1789); Endlicher: 34 (1847); Miquel: 289 (1867); Bentham: 367 (1880); Engler: 89 (1889); Hutchinson: 78 (1916); Von Breitenbach: 58 (1974); Berg *et al.*:113 (1984); Berg: 48 (1989); Van Greuning: 599 (1990); Berg: 39 (1991).

Urostigma Gasp.: 7 (1844); Miquel: 514 (1847). *Galoglychia* Gasp.: 10 (1844). *Sycomorus* Gasp.: 86 (1845). *Pharmacosycea* Miq.: 525 (1847).

Trees, shrubs, climbers, stranglers or woody epiphytes, with milky sap; plants monoecious or occasionally dioecious. **Leaves** alternate, rarely opposite or subverticillate, simple or lobed, on lower surface with waxy spots in axils of (basal) secondary veins or at base of midrib, margin entire or dentate, venation pinnate to subpalmate; stipules enveloping terminal bud, caducous, rarely subpersistent. **Inflorescences** (syconia) bisexual (with all three kinds of flowers) or functionally unisexual (either with staminate flowers and gall flowers or with seed flowers), sessile or pedunculate, borne on young growth among leaves, or on old wood of branches, or even on old trunk, in the latter cases in panicles or fascicles; bracts at ostiole or mouth of syconia in several series, either spreading horizontally across mouth or directed into interior. **Male flowers** with 1–6 tepals and 1–6 stamens; pistillode present or 0. **Female flowers** with 0–8 tepals; ovary free, mostly obliquely ellipsoid or ovoid; styles 2, unequal, or 1, usually lateral; stigma usually oblong. **Fruit** (fig/syconium) a syncarp, developing mainly from inflorescence wall, mostly fleshy, coloured or green. $x = 13$ (polyploidy).

Species ± 750, with ± 500 in Asia and Australia, ± 150 in the Neotropics and ± 100 in Africa/Madagascar, predominantly in moist forests, some (e.g. *Ficus carica* L.) in warm temperate and/or xeric regions; 26 widely distributed in sthn Afr.

Five subgenera: *Pharmacosycea*, *Urostigma*, *Ficus*, *Sycidium* and *Sycomorus*, based mainly on differences in flower construction and sex distribution.

Maclura Nutt. 1918000

Nuttall: 233 (1818) name conserved; Endlicher: 34 (1847); Engler: 74 (1889); Berg: 241 (1986); Berg: 6 (1989); Berg: 18 (1991).

Chlorophora Gaudich.: 508 (1830); Bentham: 363 (1880) in part excluding African species. *Cardiogyne* Bureau: 232 (1873); Rendle: 24 (1916); Brown & Hutchinson: 522 (1920); Berg: 359 (1977). *Maclura* Nutt. section *Cardiogyne* (Bureau) Corner: 237 (1962).

Evergreen or deciduous climbing shrubs or bushes, rarely trees, with straight to curved spines (at least on

juvenile parts); dioecious. **Leaves** distichously or spirally arranged, penninerved, petiolate, glabrous; stipules lateral, free or connate on spine-forming branchlets. **Inflorescences** many-flowered globose heads in leaf axils, solitary or in pairs, bracteate, with yellow dye-containing glands embedded in tepals and bracts. **Tepals** 4, free or connate at base. **Stamens** 4, inflexed in bud; pistillode present in male flowers. **Ovary** free or lower part adnate to perianth; stigmas 2, unequal, or 1, filiform. **Fruit** a globose syncarp, indehiscent, pulpy, yellow to orange, formed from enlarged tepals and bracts of heads of flowers, with achenes embedded in pulp. **Seeds** rather small, without endosperm; cotyledons thin, equal and plicate. $x = 14$.

Species 11, mainly tropical in the Old and New World; only 1 in Africa: *Maclura africana* (Bureau) Corner, extending from SE Kenya into sthn Afr. (Northern Province, Mpumalanga to N KwaZulu-Natal); also in Madagascar.

Morus L. 1913000

Linnaeus: 986 (1753); Linnaeus: 424 (1754); Adanson: 377 (1763); Jussieu: 402 (1789); Endlicher: 33 (1847); Bentham: 364 (1880); Engler: 72 (1889); Engler: 3 (1898); Rendle: 19 (1916); Berg: 335 (1977); Berg: 2 (1989); Berg: 13 (1991).

Trees or shrubs; plants monoecious or dioecious; leaves and shoot apices deciduous. **Leaves** distichously arranged, entire or lobed; 3–5-nerved, petiolate; stipules free, almost lateral, small, caducous. **Flowers** in solitary axillary, unisexual spikes. **Male flowers** in catkins; tepals membranous, 4-segmented, imbricate; stamens 4, filaments free, inflexed in bud. **Female flowers** in short, dense heads; tepals 4, decussate, imbricate, becoming succulent in fruit. **Ovary** enclosed within calyx, ovoid or subglobose; ovule pendulous; style short or obsolete; stigmas 2, (sub)equal. **Fruit** a ± succulent syncarp, of persistent fleshy tepals and exocarp; endocarp crustaceous. **Seeds** small, with endosperm; cotyledons thin, equal, plane, with membranous testa. $x = 14$ (can also be 7) (high polyploidy, B-chromosomes).

Species ± 13, in temperate to subtropical regions of the Old and New World; only 1 species native in Africa: *Morus mesozygia* Stapf, KwaZulu-Natal; 2 species are escapes from cultivation: **Morus alba* L. (the White Mulberry) and **Morus japonica* Audib.

Trilepisium Thouars 1960020

Thouars: 22 (1806); Candolle: 639 (1825); Berg: 297 (1977); Berg *et al.*: 104 (1984); Berg: 17 (1989); Berg: 28 (1991); Friis: 170 (1992).

Bosqueia Thouars ex Baill.: 338 (1863); Bentham: 370 (1880); Engler: 88 (1889); Engler: 35 (1898); Hutchinson: 218 (1917). *Pontya* A.Chev.: 210 (1912).

Evergreen trees, up to 30 m tall, with milky latex; monoecious. **Leaves** alternate, simple, shortly petiolate, entire with long, slender drip-tip, coriaceous, pinnately veined to subtriplinerved; stipules fused, amplexicaul, caducous. **Inflorescence** a discoid to turbinate receptacle with a solitary central female flower surrounded by numerous free stamens (male flowers not discernable), axillary, pedunculate, usually solitary, initially enveloped by 2 coriaceous scale leaves (modified stipules), with a 6–8-lobed membranous involucre; interfloral bracts 0. **Female flower** solitary, basally embedded in receptacle; perianth tubular, 4-lobed or irregularly incised; ovary adnate to perianth; stigmas 2, ligulate, equal. **Fruit** a fleshy, urn-shaped syncarp wide open at apex, formed by the enlarged, fleshy, dark purple to red receptacle crowned with remnants of stamens and marginal part of receptacle. **Seeds** large, without endosperm; cotyledons equal, thick and fused. $x = 12$ (1 report).

Monotypic, tropical Africa, from Guinea to S Ethiopia, East Africa and southwards to sthn Afr. (Northern Province); also in Madagascar and Seychelles.

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Moringaceae

(Dilleniidae—Capparidales)

Compiled by M. Jordaan

Trees, often with very thick swollen trunks, sometimes shrubs with tuberous rootstocks (often smelling and tasting of horseradish); wood often brittle; bark pale grey to whitish, smooth, sometimes resinous or gummy. **Leaves** alternate, usually bi-imparipinnate, petiolate, deciduous or rachis sometimes persistent; pinnae and pinnules mainly opposite or sometimes subopposite, entire; stipules usually minute, caducous, stipitate glands at base of petioles and pinnae. **Inflorescences** paniculate, many-flowered, axillary. **Flowers** bisexual, regular to somewhat irregular, usually showy, perigynous with sepals, petals and stamens fused at base into a cup-like hypanthium. **Sepals** 5, free above hypanthium, petaloid, equal or unequal in size, imbricate in bud, fifth posticous. **Petals** 5, free, alternating with sepals, equal or unequal in size, imbricate, white. **Stamens** 5, inserted on margin of disc or epipetalous, declinate, alternating with 3–5 staminodes; filaments free or partly united; anthers 1-thecous, dorsifixed, dehiscing lengthwise by a slit, sometimes cohering. **Ovary** superior, consisting of 3 fused carpels, 1-locular, stipitate, cylindrical; ovules many in 2 series on 3 parietal placentas, pendulous, anatropous, bitegmic; style terete, slender, hollow, truncate at apex and without stigmatic lobes. **Fruit** an elongated, beaked, 1-locular, many-seeded, pod-like capsule opening by 3 valves, 3–6-angled, sometimes torulose. **Seeds** large, with 3 membranous wings; endosperm 0; embryo straight and oily. $x = 7$ (polyploidy).

Genus 1, species ± 14, Africa and Madagascar to N India; sthn Afr.: genus 1, species 1.

Brown: 238 (1826), as Moringeae; Hooker: 429 (1862); Pax: 693 (1936); Leistner: 184 (1970); Verdcourt: 1 (1985); Verdcourt: 1 (1986).

Moringa Adans. 3128000

Adanson: 318 (1763); Jussieu: 348 (1789); Hooker: 430 (1862); Marloth: 244 (1913); Pax: 697 (1936); Friedrich-Holzhammer: 1 (1966); Leistner: 184 (1970); Verdcourt: 1 (1985); Verdcourt: 1 (1986).

Hyperanthera Forssk.: 67 (1775).

Description as for family.

Species ± 14; 9 ± endemic to NE Africa with 1 extending to Israel and Arabia, 1 endemic to Namibia and SW Angola, 2 to Madagascar and 2 to India; 1 in sthn Afr.: *Moringa ovalifolia* Dinter & Berger, Namibia. **Moringa oleifera* Lam. is extensively cultivated mainly as individual trees throughout the tropics in ± dry areas. The seeds are the source of ben oil, leaves and fruits are eaten as vegetables and the root as a horseradish substitute.

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*Myoporaceae

(Asteridae—Scrophulariales)

Compiled by W.G. Welman

Evergreen shrubs and trees. **Leaves** alternate, simple, entire or toothed, gland-dotted; stipules 0. **Flowers** bisexual, ± regular, solitary or in axillary clusters among the foliage, small, white, bell-shaped; bracts small or absent. **Calyx** 5-partite or 5-lobed. **Corolla** gamopetalous, usually 5-lobed; tube short and more or less campanulate, or elongate and infundibuliform or cylindric, limb subregular, oblique, or bilabiate; lobes imbricate, with two upper often exterior, sometimes largely connate. **Stamens** 4, rarely as many as corolla lobes, didynamous or subequal, inserted in corolla and alternating with its lobes, included or exserted; filaments filiform or thickened at base, sometimes shorter than anthers; anthers 2-thecous, with thecae at first parallel, later diverging from confluent apex; staminode 1. **Disc** hypogynous, small or obsolete. **Ovary** superior, 2-locular, or more or less completely 3–10-locular by the intrusion of septa between ovules, 3–8 ovules in each of the two locules, or solitary when ovary 3–10-locular; placentation axile; style simple; stigma terminal. **Fruit** a small ± succulent drupe; exocarp rarely dry; endocarp hard. **Seeds** in one series around axis; rarely superposed. $x = 9$ (polyploidy).

Genera 3; species ± 220, mostly Australia, also Pacific, Indian Ocean, tropical America; sthn Afr.: 1 genus, 2 species.

Bailey & Bailey: 748 (1977).

***Myoporum** Banks & Sol. ex G.Forst. 8112000

Banks & Solander: 44 (1786); Bailey & Bailey: 748 (1977).

Description as for family.

Species 32, mostly Australia; 2 species naturalised along coast of southern Cape region.

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Myricaceae

(Hamamelidae—Juglandales)

Compiled by M. Jordaan

Shrubs or small trees, evergreen or deciduous, often aromatic and resinous; roots commonly with nitrogen-fixing nodules; plants monoecious or dioecious. **Leaves** alternate, simple, entire, serrate, irregularly toothed or lobed, often gland-dotted, usually leathery, petiolate; stipules 0. **Inflorescences** axillary, ± erect, catkin-like spikes, usually surrounded by 2–6 bracteoles; male spikes often dense, sometimes spikes with male flowers below and female flowers above; female spikes longer or shorter than male. **Flowers** inconspicuous, unisexual, occasionally bisexual, wind-pollinated. **Perianth** 0. **Male flowers** subtended by solitary bracts; stamens 2–8(–20), often 4–6; filaments short, free or ± cohering; anthers dorsifixed, 2-thecous, erect, ovate, extrorsely dehiscing by longitudinal slits; ovary rudimentary. **Female flowers** subtended by solitary bracts; bracteoles present or 0; gynoecium 2-carpellate; ovary superior, sessile, 1-locular; ovule solitary, basal, erect; style short; stigmas 2, filiform or occasionally short. **Fruit** a drupe, globose or ovoid, usually warty, often covered with white wax, sometimes with gladular dots, enclosed by persistent bracts and bracteoles; endocarp hard. **Seed** with little or no endosperm; embryo straight. $x = 8$ (high polyploidy).

Genera 4, species ± 55, mostly in temperate to subtropical and tropical-montane regions of the world; two monotypic genera: one endemic to New Caledonia and the other to eastern North America; sthn Afr.: genus 1, species 9.

Blume: 3 (1829); Bentham: 400 (1880); Engler: 26 (1888); Chevalier: 85 (1901); Killick: 5 (1969); Kubitzki: 453 (1993); White: 173 (1993); Mabberley: 473 (1997).

Morella Lour. 1874000

Loureiro: 548 (1790); Wilbur: 93 (1994); Killick *et al.*: 993 (1998).

Myrica L.: 1024 (1753); Linnaeus: 449 (1754) in strict sense; Jussieu: 409 (1789) in part; Blume: 3 (1829) in part; Bentham: 400 (1880) in part; Engler: 27 (1888) in part; Chevalier: 85 (1901) in part; Hutchinson: 307 (1917) in part; Hutchinson: 561 (1925) in part; Adamson: 311 (1950) in part; Killick: 5 (1969) in part; Polhill: 261 (1989) in part; Kubitzki: 456 (1993) in part; White: 175 (1993) in part.

Description as for family.

Species ± 53, temperate and subtropical parts of both hemispheres; 9 in sthn Afr., Namibia, Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Lesotho, but mainly in the Western and Eastern Cape.

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Myrothamnaceae

(Hamamelidae—Hamamelidales)

Compiled by M. Jordaan

Shrubs or shrublets, completely glabrous, sympodially branched, lateral vegetative branches forming short shoots; balsamic-resinous, aromatic; plants dioecious. **Leaves** opposite-decussate, small, with broad, sheathing bases, articulated to short petiole, able to survive strong desiccation; blade folded fan-wise, obtriangular-obovate, distally dentate, with palmate-flabellate venation; stipules paired, lateral, subspinous, adnate to and persistent with petioles. **Inflorescences** catkin-like, erect, terminal on short-shoots, with or without a terminal flower, flowers (or flower triads at base of inflorescence) opposite and subtended by foliose or bracteose, cucullate bracts, sometimes interpreted as tepals (Kubitzki 1993). **Flowers** unisexual, regular, hypogynous, sessile, bibracteolate, wind-pollinated. **Sepals** 0. **Petals** 0. **Male flowers** with (3–)5(–8) stamens; filaments connate at base into a central column; anthers basifixed, 2-thecous, dehiscing by longitudinal slits, their connective prolonged into a short beak; pollen dispersed as tetrads; without rudimentary ovary. **Female flowers** with gynoecium of (2)3 or 4 ± fused carpels, superior, sessile, (2)3- or 4-locular and -lobed; carpels ± free above; ovules many, in 2 rows on inner angles of locules, on central-axile placenta, anatropous, bitegmic and crassinucellar; styles 3 or 4, recurved; stigmas ventrally decurrent, with crinkled margins; staminodes 0. **Fruit** dry, a small capsule, ventricidally dehiscent. **Seeds** many, minute, pendulous, ovoid, with thin, reticulate testa; endosperm copious and oily; embryo minute. $x = 10$ (1 report).

Genus 1, species 2, Madagascar and southern tropical Africa; sthn Afr.: genus 1, species 1.

Niedenzu: 102 (1891); Nicdcnzu: 262 (1928); Bywater: 1 (1984); Dahlgren & Van Wyk: 13 (1988); Kubitzki: 468 (1993); Mabberley: 475 (1997).

Myrothamnus Welw. 3282000

Welwitsch: 578 (1859a); Welwitsch: 150 (1859b); Welwitsch: 22 (1869); Olivcr: 403 (1871); Niedenzu: 262 (1928); Weimarck: 451 (1936); Friedrich-Holzhammer: 1 (1966); Mcndes: 69 (1978); Bywater: 1 (1984); Dahlgren & Van Wyk: 13 (1988); Kubitzki: 469 (1993).

Description as for family.

Species 2; 1 in sthn Afr.: *Myrothamnus flabellifolius* Welw., a rcsurrection plant rapidly reviving after rain when the foldcd, blackish, fragile leaves grcen up (Mabberley 1997), Namibia, Botswana, Northern Province, North-Wcst, Gauteng, Mpumalanga, Swaziland and N KwaZulu-Natal. *Myrothamnus moschatus* (Baill.) Baill. recorded from Madagascar.

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Myrsinaceae

(Dilleniidae—Primulales)

Compiled by M.A. Ngwenya

Trees, shrubs or lianes, rarely subherbaceous, sometimes dioecious. **Leaves** alternate, rarely subopposite, simple, often crowded near ends of branches, petioled or subsessile, entire or toothed, often glandular or with lepidote scales; stipules 0. **Inflorescence** terminal or lateral, racemose, paniculate, umbellate or fasciculate. **Flowers** bisexual or unisexual, regular, usually small and individually inconspicuous. **Calyx** of 4 or 5 free or connate sepals, often ciliate, often with dark spots, aestivation valvate, imbricate or contorted. **Corolla** of 4 or 5 petals, united towards base, sometimes petals free, often with dark dots or stripes, often papillose, usually white or pink, less frequently purple or yellow. **Stamens** as many as and opposite corolla lobes; anthers introrse, dehiscing by longitudinal slits or rarely by apical pores; filaments present or obsolete, long or short, attached to petals or almost free. **Ovary** superior, but semi-inferior to inferior in *Maesa*, unilocular with 1–many ovules on a free-central or basal placenta; globose, ovoid or clavate; style simple, long to almost obsolete; stigma often discoid. **Fruit** an indehiscent berry or drupe, 1-seeded except for *Maesa* which is many-seeded. **Seeds** with copious, often ruminate, endosperm; embryo ± straight.

Genera ± 40, species ± 1 000, worldwide, mainly in the tropics and subtropics; sthn Afr.: genera 4, species 7.

Baker: 491 (1877); Harvey & Wright: 431 (1906); Phillips 465 (1951); Dyer: 1 (1963); Kupicha: 198 (1983); Halliday: 1 (1984).

Key to genera

1a Ovary inferior or half-inferior; seeds many, crowded on the surface of the free-central placenta, polyhedral, with smooth endosperm; petals united; fruit crowned with persistent calyx remains ..... **Maesa**

1b Ovary superior; seeds solitary, depressed-globose, with ruminate endosperm; fruit with calyx sometimes persisting at base:

2a Leaves 5–50 mm long, crowded, not confined to branch ends, the margin minutely serrate; flowers in axillary fascicles ..... **Myrsine**

2b Leaves usually longer than 50 mm, not as above but often confined to branch ends, entire, crenate or coarsely dentate; flowers in fascicles or inflorescence pedunculate:

3a Tree; peduncles absent; flowers in dense fascicles; anthers sessile, adnate to corolla: ..... **Rapanea**

3b Lianes or shrubs; peduncles present; flowers in racemes or umbels; anthers borne on long filaments ..... **Embelia**

Embelia Burm.f. 6310000

Burman: 62 (1768); Mez: 295 (1902); Harvey & Wright: 433 (1906); Phillips: 563 (1951); Dyer: 3 (1963).

Shrubs or small trees, or sometimes scandent, rarely arborescent. **Leaves** entire or crenate. **Flowers** small, often unisexual, borne in axillary racemes or umbels or in terminal or lateral panicles. **Calyx** with sepals sometimes almost free or connate, imbricate, usually marked with resiniferous dots. **Corolla** with petals free, or shortly connate, elliptic, obovate or oblong, spreading or reflexed, sometimes glandular, inner surface and sometimes outer margins densely papillose. **Stamens** free, shorter or longer than corolla, variously attached to petals; filaments linear; anthers ovate, dehiscing by slits or very rarely by pores. **Ovary** superior, subglobose or ovoid, often pilose; style long or short; ovule single; stigma discoid, entire or very rarely lobed; young capsule sometimes thin-walled. **Fruit** a globose, 1-seeded drupe, up to ± 14 mm in diameter; pericarp fleshy; endocarp woody.

Species ± 130, through Asia, Australia, Mascarene Islands, as well as tropical Africa; 2 in sthn Afr.: *Embelia ruminata* (E.Mey. ex A.DC.) Mez, Namibia, KwaZulu-Natal and Eastern Cape. A specimen from the Caprivi (Namibia) has been referred to by Dyer: 5 (1963) as *E. sp.*, by Kupicha: 198 (1983) as *E. schimperi* Vatke and by Halliday: 14 (1984) as *E. xylocarpa* P.Halliday.

Maesa Forssk. 6383000

Forsskål: 66 (1775); Candolle: 77 (1844); Baker: 491 (1877); Mez: 15 (1902); Harvey & Wright: 432 (1906); Phillips: 562 (1951); Dyer: 1 (1963); Kupicha: 198 (1983); Halliday: 2 (1984).

Trees, shrubs or scramblers; sometimes with runners. **Leaves** petioled, simple, mostly serrate, often gland-dotted. **Flowers** bi- or unisexual, usually in axillary racemes or panicles. **Calyx** persistent, bibracteate at base, with (4)5 sepals, imbricate. **Corolla** campanulate, longer than calyx with spreading lobes, connate at base into a short tube. **Stamens** arising in mouth of corolla tube; filaments usually long, very rarely short or 0; anthers oblong-cordate, often emarginate, dorsifixed at or below middle, dehiscing by longitudinal slits or aborted. **Ovary** inferior or semi-inferior; style short or almost obsolete; stigma often distinctly or indistinctly lobed; ovules usually many, arranged in several rows on placenta. **Fruit** small, indehiscent, dry or fleshy, globose, ovoid or subturbinate, crowned with persistent style and calyx, several-seeded. **Seeds** small, embedded in placenta, irregularly polyhedral, globose or turbinate; embryo oblique or almost transverse. $x = 10$ (6).

Species ± 200, tropics of Old World; 2 in sthn Afr.: *Maesa lanceolata* Forssk., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape; *M. alnifolia* Harv., KwaZulu-Natal and Eastern Cape.

Myrsine L. 6313000

Linnaeus: 196 (1753); Linnaeus: 90 (1754); Mez: 338 (1902); Harvey & Wright: 434 (1906); Phillips: 563 (1951); Dyer: 5 (1963); Kupicha: 201 (1983); Halliday: 6 (1984).

Shrubs, functionally dioecious or polygamo-dioecious, much-branched, up to 3 m high. **Leaves** broadly to narrowly elliptic, acute or obtuse, usually toothed in the apical half, glabrous, coriaceous. **Flowers** very small, subsessile, often unisexual, borne in few-flowered axillary fascicles. **Calyx** free or shortly connate at base, margin usually ciliate, sometimes glandular. **Corolla** longer than calyx; tube short; lobes 4 or 5, often ciliate and glandular. **Stamens** included in or exceeding corolla; filaments present, arising from below mouth of corolla tube; anthers often longer than filaments, dehiscing by slits. **Ovary** superior, ovoid or ellipsoid, glabrous; style short, cylindric; stigma large, disciform or with incised margin; placenta with few ovules in 1 row. **Fruit** a globose, 1-seeded, fleshy drupe with crustaceous endocarp. **Seed** subglobose, with ruminate endosperm. $x = 23$ (polyploidy).

Species ± 7, from Africa to E Asia; 2 in sthn Afr.: *Myrsine africana* L., Northern Province, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape; *M. pillansii* Adamson, KwaZulu-Natal and Western Cape.

Rapanea Aubl. 6314000

Aublet: 46 (1775); Mez: 342 (1902); Phillips: 563 (1951); Dyer: 6 (1963); Kupicha: 203 (1983); Halliday: 8 (1984).

Trees and shrubs, glabrous or pubescent. **Leaves** sessile or shortly petiolate, entire, or very rarely dentate, punctate, glabrous but often with lepidote scales when young. **Flowers** bisexual or unisexual, in small fascicles on bare branches or in axils of leaves. **Calyx** with sepals free or connate, often ciliate at margin, glandular or dotted. **Corolla** longer than calyx, sometimes tube very short; lobes oblong to ovate, often papillose at margin, sometimes glandular-ciliate. **Stamens** arising in throat of corolla; filaments 0; anthers sessile or subsessile, comparatively large, dehiscing by slits. **Ovary** superior, globose or ellipsoid; style thick, sometimes obsolete; stigma variable in shape, elongated, scutate or capitate, sessile, often lobed or morchelliform; placenta with few ovules in 1 row. **Fruit** dry or fleshy, 1-seeded with hard endocarp. $x = 12$ (polyploidy).

Species ± 100, widely spread in tropical countries, and throughout most of Africa; 2 in sthn Afr.: *Rapanea melanophloeos* (L.) Mez, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape; *R. gilliana* (Sond.) Mez, Western and Eastern Cape.

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Myrtaceae

(Rosidae—Myrtales)

Compiled by H.F. Glen & J.E. Victor

Trees or shrubs, rarely undershrubs or dwarf perennials from a woody rootstock. **Leaves** opposite or rarely alternate, simple, entire, gland-dotted; stipules 0 or very small. **Flowers** bisexual, regular, in cymes, heads, umbels, or corymbs, rarely solitary; bracts and bracteoles often present. **Calyx** 3–5-lobed or sometimes entire; tube (hypanthium) ± adnate to ovary, and sometimes extending beyond it. **Petals** 4 or 5 (6 or more), sometimes connate and all deciduous together, imbricate. **Disc** lining calyx tube or flat. **Stamens** many, in 1–many series, inflexed in bud, free or connate at base; filaments often thread-like; anthers small, 2-thecous, usually opening by lengthwise slits. **Ovary** inferior, sometimes half-superior, 2–many-locular, usually with many axile, anatropous to campylotropous ovules in each locule, rarely 1 or few; style simple; stigma capitate, entire, or sometimes 3- or 4-parted. **Fruit** a capsule or berry, wholly or partly enclosed in persistent calyx tube. **Seeds** 1–many; testa often woody and glandular.

Genera 100–120, species 3 900, mainly tropical and subtropical Australia and South America; sthn Afr.: genera 9 (6 naturalised), species ± 34 (± 13 naturalised).

Sonder: 520 (1862); Friedrich-Holzhammer: 1 (1966); Proctor: 512 (1972); George: 1 (1988).

Key to genera

1a Fruit fleshy, edible:
2a Flowers in axillary fascicles or terminal panicles:
3a Calyx tube sharply distinguished from pedicel; limb of calyx deeply 4(5)-lobed ..... **Eugenia**
3b Calyx tube contracted gradually into pedicel; limb of calyx entire or repandly lobed ..... **Syzygium**
2b Flowers solitary:
4a Leaves generally less than 10 mm wide; hypanthium not or hardly produced beyond summit of ovary ..... ***Myrtus**
4b Leaves generally over 30 mm wide; hypanthium produced beyond summit of ovary ..... ***Psidium**
1b Fruit a capsule, dehiscent:
5a Petals and calyx fused into an operculum, deciduous at anthesis ..... ***Eucalyptus**
5b Perianth not as above:
6a Flowers pedicellate, in panicles:
7a Flowers basally connate ..... ***Syncarpia**
7b Flowers free ..... **Metrosideros**
6b Flowers sessile, solitary or in spikes:
8a Flowers solitary; calyx persisting; stamens generally short and not showy ..... ***Leptospermum**
8b Flowers in spikes; calyx not persisting; stamens long and brightly coloured ..... ***Callistemon**

*Callistemon R.Br. 5602000

Brown: 547 (1814); Stanley & Ross: 133 (1986); Mitchem: 29 (1993) user-friendly key to commonly cultivated and naturalised species.

Shrubs or small trees. **Leaves** alternate. **Flowers** in cylindrical spikes, at first terminal but axis soon growing out into leafy shoot; hypanthium ovoid, campanulate or urceolate. **Sepals** 5. **Petals** 5, usually red. **Stamens** many, much longer than petals, in 2 or more series, rarely united in short ring at base, brightly coloured. **Ovary** 3- or 4-locular; ovules many per locule; style simple; stigma usually inconspicuous. **Fruit** a woody capsule, usually remaining on stem for several years. **Seeds** very small, many. $x = 11$ (polyploidy).

Species 20 or more, endemic in Australia; 2 (**Callistemon rigidus* R.Br. and **C. speciosus* (Sims) DC.) naturalised in Eastern Cape.

*Eucalyptus L'Hér. 5598000

L'Héritier: 18 (1788); Adamson: 605 (1950); Brice-Bruce: 6 (1979); Brooker & Kleinig: 4 (1983); Chippendale: 1 (1988).

Trees, shrubs or mallees; bark smooth, fibrous, stringy or tessellate. **Leaves**: plants heterophyllous, i.e. seedling, juvenile, intermediate and adult phases occurring in most species, the latter phases sometimes not achieved; adult leaves glabrous, mostly alternate, usually petiolate, lanceolate, often falcate, pendulous, rarely erect, with a distinct midvein, penninerved or with parallel veins. **Flowers** in conflorescences usually of umbel-like condensed dichasia, usually pedunculate, single or rarely paired in leaf axils, or in terminal sometimes corymbose panicles; flowers 3 or more per umbel, rarely single, sessile or pedicellate, sometimes male only. **Calyx** and **corolla** each or together forming an operculum that is shed at anthesis; sepals sometimes free, falling separately or together. **Disc** convex, flat or descending. **Stamens** many, usually on a staminophore; anther connective usually bearing a gland on back or at apex. **Ovary** 2–7-locular, inferior or partly superior; ovules many; ovulodes usually present. **Fruit** a capsule with a usually woody hypanthium, loculicidal, rarely circumscissile, with scars of operculum and staminophore at rim; valves exserted, level with rim or included. **Seeds** several to many, variously shaped and coloured. $x = 11$ (10, 12, 14) (polyploidy).

Almost 600 species, mostly Australian but some extending into Indonesia; some 320 have been cultivated in sthn Afr. and ± 6 occur as escapes.

Eugenia L. 5578000

Linnaeus: 470 (1753); Sonder: 521 (1862).

Trees or shrubs, rarely undershrubs or dwarf perennials from a woody rootstock, sometimes dioecious. **Leaves** opposite, simple, entire, linear to elliptic, gland-dotted. **Flowers** in cymose racemes or flowers solitary, axillary or terminal; bracts and bracteoles often small, often caducous. **Calyx** 4(5)-lobed, sharply distinguished from pedicel; tube subglobose, united to ovary and seldom exceeding it. **Petals** 4(5). **Disc** lining upper portion of calyx tube or flat. **Stamens** 4 times as many as petals or more numerous, longer than calyx lobes; anthers versatile. **Ovary** 2-locular, with 2–many ovules in each locule; stigma capitate. **Fruit** a berry, subglobose, crowned with persistent calyx; usually 1-locular by abortion. **Seeds** 1 or 2, large; testa often rough, glandular. $x = 11$ (aneuploids, polyploidy).

Species 1 000, ± cosmopolitan in warm climates; 14 in sthn Afr., Northern Province, Swaziland, KwaZulu-Natal and Eastern Cape.

*Leptospermum J.R.Forst. & G.Forst. 5599000

Forster & Forster: pl. 71 t. 36 (1776); Adamson: 604 (1950); Levyns: 207 (1966); Thompson: 339 (1989).

Shrubs or trees with smooth and flaking, fibrous or papery bark. **Leaves** alternate, often variable in shape within species but mostly almost elliptic, apex various, base sessile or shortly petiolate, often varying within species, margins entire, surface variously curved, often recurved and incurved in different parts of the same leaf; texture often thick or firm; often aromatic, occasionally lemon-scented; stipules minute, usually seen only about flowers. **Flowers** 2-bracteolate, often pedicellate, in axils of bracts on condensed shoots or, rarely, as monads in leaf axils. **Calyx**: hypanthium obtuse or variously tapered at base and erect or spreading above at anthesis. **Sepals** 5, imbricate, persistent or deciduous. **Petals** 5, spreading, conspicuous, deciduous, white, pink or red. **Stamens** usually shorter than petals, in 5 antepetalous groups but appearing free, spread evenly along rim of hypanthium; anthers versatile, conspicuous gland near connective and thickened area at base of each theca. **Ovary** (2)3–5 or more-locular; ovules few to many, anatropous; style simple, base usually inset in a depression in ovary summit; stigma entire or occasionally somewhat lobed. **Fruit** a rigid or woody capsule with valves opening at top. **Seeds** somewhat ovoid; testa reticulate, occasionally ridged or winged or irregularly linear and striate. $x = 11$ (aneuploids, polyploidy).

Species ± 80, Australia; 1: **Leptospermum laevigatum* F.Muell., Australian Myrtle, naturalised on Cape Flats (Western Cape).

Metrosideros Banks ex Gaertn. 5588000

Gaertner: 170, t. 34 (1788) name conserved; Sonder: 521 (1862).

Trees or shrubs, rarely scandent. **Leaves** opposite, rarely almost alternate. **Flowers** often showy, in dense di- or trichotomous terminal cymes, rarely axillary. **Calyx** 5-lobed; tube campanulate, funnel-shaped, or urceolate, ± adnate to base of ovary; lobes imbricate. **Petals** 5, spreading, longer than calyx lobes, obovate-spatulate, white. **Stamens** 20–30 or more, in 1–many series, much longer than petals, free; anthers versatile. **Ovary** usually semi-inferior, 3(4)-locular, with several to many ovules in each locule; style shorter than stamens; stigma truncate or capitate. **Fruit** a capsule, included in or shortly exserted from persistent calyx tube, 2- or 3(4)-locular. **Seeds** many in each locule; variously shaped. $x = 11$.

Species 60, mostly Australia, New Zealand, Malay Archipelago and associated islands; 1 in sthn Afr.: *Metrosideros angustifolia* (L.) J.E.Sm., Western Cape as far north as Clanwilliam and Ceres Districts.

***Myrtus** L. 5558000

Linnaeus: 471 (1753); Adamson: 604 (1950); Zohary: 371 (1972).

Evergreen aromatic shrubs. **Leaves** opposite or in whorls; leathery, glabrous. **Flowers** axillary, solitary or in short cymes. **Sepals** 5, somewhat connate at base. **Petals** 5, spreading, white. **Stamens** many, free, in several rows; connective usually gland-tipped. **Ovary** inferior, with 2 or 3 locules almost or completely separated; ovules many in each locule, campylotropous; style filiform; stigma mostly small. **Fruit** a 2- or 3-celled berry, crowned with persistent calyx lobes. **Seeds** reniform. $x = 11$.

Species ± 100, mainly in South America and Australia; 1 species: **Myrtus communis* L., naturalised around Cape Town and Paarl (Western Cape).

***Psidium** L. 5559000

Linnaeus: 470 (1753); McVaugh: 385 (1963); McVaugh: 404 (1968); Proctor: 518 (1972).

Small trees or large shrubs; young branches often pubescent, terete or sometimes square. **Leaves** opposite, elliptical, leathery. **Flowers** in a 3-flowered dichasium or solitary, on new growth. **Calyx** various, usually splitting irregularly down to ovary in anthesis, its tube (hypanthium) prolonged beyond summit of ovary, of 4 or 5 distinct teeth or lobes, completely closed in bud, or with an apical pore. **Petals** 5, spreading, white. **Stamens** conspicuous, many, in many series, much longer than petals; anthers versatile. **Ovary** 2- to 7-locular, sporophores apparently arising from central axis of ovary, mostly connate in pairs and simulating stalked, axile, bilamellate placentae. **Fruit** often fleshy, many-seeded, sometimes large and edible. **Seeds** hippocrepiform or reniform, with bony testa and uncinate or curved embryo. $x = 11$ (high polyploidy).

Species ± 100, North America to Brazil; 2 or more naturalised in warm, moist parts of Mpumalanga, Swaziland and KwaZulu-Natal.

***Syncarpia** Ten. 5593000

Tenore: 12 (1839); Stanley & Ross: 200 (1986); Bean: 338 (1995).

Trees, rarely shrubby, to 60 m tall; bark fibrous, deeply furrowed, grey on surface, brown below; seedlings with lignotubers. **Leaves**: seedling leaves opposite, not forming pseudowhorls; adult leaves forming pseudowhorls of 4 leaves near branch tips, hairy or glabrous. **Flowers** in a 7- (or fewer by abortion) flowered dichasium; flowers sessile and basally connate; bracts 2 per inflorescence, persistent, becoming fused to base of fruit. **Calyx** lobes 4 or 5, small, persistent. **Petals** 4 or 5, white, orbicular, caducous. **Stamens** many, in 2(3) whorls, free, much longer than petals; filaments white; anthers versatile. **Ovary** inferior, 3(4)-locular. **Fruit** capsular, fruiting hypanthia connate forming a woody, compound fruit. **Seeds** straight or slightly curved, narrowly cuneate. $x = 11$.

Species 3, endemic to Australia; **Syncarpia glomulifera* (Sm.) Nied., occasionally naturalised in sthn Afr.

Syzygium Gaertn. 5583000

Gaertner: 166 (1788) name conserved; Sonder: 521 (1862).

Trees or shrubs. **Leaves** opposite. **Flowers** in axillary and terminal cymes or corymbs. **Calyx** shortly lobed, truncate, or sinuate; tube obovate or club-shaped, sometimes produced above ovary. **Petals** 4 or 5, ± connate and falling entire, mostly white. **Stamens** many, in many series, much longer than petals; anthers versatile. **Ovary** in upper part of receptacle, 2-locular, with a few ovules in each locule; style somewhat thick and flattened; stigma simple. **Fruit** a berry, 1-locular by abortion. **Seeds** 1–few, globose. $x = 11$ (6, 8, 9) (polyploidy, B-chromosomes).

Species 500, fairly cosmopolitan in warm areas; 6 in sthn Afr., widespread except in North-West, Free State, Lesotho and Northern and Western Cape.

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Neuradaceae

(Dilleniidae—Malvales)

Compiled by M. Jordaan

Annual, prostrate, tomentose herbs with sympodial stems with lysigenous mucilage ducts in the pith. **Leaves** alternate, toothed or pinnately lobed or pinnatifid; stipules wanting from most leaves, present on some. **Flowers** bisexual, regular, solitary or in pairs on axillary pedicels, ± epigynous. **Perianth**: tube (receptacle, hypanthium) distinct but sometimes short, enlarged and woody in fruit; lobes 5, valvate, sometimes alternating with epicalyx lobes. **Petals** 5, free, distinct, imbricate or convolute. **Stamens** 10, in 2 series, free on slightly prolonged hypanthium; filaments filiform; anthers tetrasporangiate and 2-thecous with unique bipolar pollen with 3 or 4 pores at each end. **Gynoecium** of (3)5–10 carpels united to form a compound, ± inferior, plurilocular ovary, immersed in perianth tube; ovules solitary in each locule, apical-axile, pendulous, anatropous (apotropous), bitegmic, crassinucellar; styles distinct, persistent, becoming indurated; stigmas capitate. **Fruit** indehiscent, dry, few-seeded, spiny and/or with winged margin formed from accrescent perianth lobes. **Seed** without endosperm, germinating in hypanthium; cotyledons flat.

Genera 3, species ± 10; 2 genera restricted to semi-arid regions of sthn Afr., 1 genus in N Africa and across the Middle East to India; sthn Afr.: genera 2, species ± 9. The presence of *Neurada* L. in sthn Afr. (Dyer 1975) could not be confirmed.

Link: 97 (1831); Endlicher: 1249 (1840) as Rosaceae suborder Neuradaceae; Focke: 1 (1894) as Rosaceae; Schulze-Menz: 218 (1964) as Neuradaceae; Friedrich-Holzhammer: 1 (1968); Cronquist: 577 (1981); Reveal: 119 (1992); Mabberley: 488 (1997).

Key to genera

Spines on fruit represented as little knobs ..... **Grielum**
Spines on fruit in 3 series, long and short ones intermixed, with tips of spines either straight or incurved ..... **Neuradopsis**

Grielum L. 3391000

Linnaeus: 578 (1764); Gaertner: 180 t. 36 (1788); Candolle: 549 (1825); Endlicher: 1219 (1840); Harvey: 304 (1862); Focke: 49 (1894); Hooker: 626 (1865); Levyns: 451 (1950); Friedrich-Holzhammer: 1 (1968).

Annual, dwarf herbs, cano-tomentose or woolly, with taproot. **Leaves** pinnately lobed or pinnatifid, petiolate; stipules obsolete. **Flowers** large, solitary. **Perianth**: tube campanulate, shallow, ebracteolate; lobes spreading; tube and lobes accrescent in fruit. **Petals** imbricate, arising in throat of perianth tube, alternate with lobes, large, obovate, convolute, yellow. **Stamens** arising in throat of perianth tube. **Gynoecium** of 5–10 carpels connate to each other and to perianth tube; styles 5–10, filiform, short. **Fruit** depressed, of 5–10 carpels, indehiscent, enclosed in somewhat woody perianth tube surrounded by spreading, accrescent, marcescent perianth lobes; with spines in form of little knobs.

Species ± 6, Namibia, Botswana, Northern and Western Cape.

Neuradopsis Bremek. & Oberm. 3390010

Bremekamp & Obermeyer: 415 (1935); Friedrich-Holzhammer: 1 (1968); Mendes: 8 (1978).

Low-growing annual herbs, diffusely to densely branched, cano-tomentose, sometimes with taproot. **Leaves** in groups of 3 at each node, these groups alternate on stem with petioles connate at the very base, crenate, serrate or pinnately lobed; stipules 0. **Flowers** solitary, ebracteate. **Perianth**: tube cup-shaped, concrescent with carpels in fruit, surrounded by 2 or 3 series of inconspicuous spinules, ebracteolate; lobes oblong, with triangular apex. **Petals** large, with convolute aestivation, arising at mouth of perianth tube, spreading. **Stamens** arising in throat of perianth tube. **Gynoecium** of 10 carpels adhering to each other and to perianth tube, verticillate; styles 10, free, subterete, persistent in fruit. **Fruit** dry, ± depressed-discoid, 10-locular, indehiscent, invested by enlarged spiny perianth tube developing a circular wing and crowned by marcescent perianth lobes; spines in 3 series, with long and short ones intermixed and tips either straight or incurved. **Seed** solitary and horizontal in each locule.

Species 3, Namibia, Botswana and Northern Cape.

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Nyctaginaceae

(Caryophyllidae—Caryophyllales)

Compiled by M. Jordaan

Annual or perennial herbs, shrubs, climbers or trees, producing betalains but not anthocyanins; roots sometimes fleshy to tuberous; stem frequently swollen at nodes, sometimes spiny. **Leaves** usually opposite, sometimes alternate, whorled or nearly so, often unequal, simple, entire to sinuate, mostly petiolate; stipules 0. **Inflorescences** terminal or axillary cymes, panicles, or corymbs; bracts and bracteoles mostly present, sometimes very small and early caducous; bracts often enlarged, sometimes petaloid, free or connate, sometimes forming a calyx-like, 1–many-flowered involucre. **Flowers** bisexual or sometimes unisexual, regular, rarely irregular, often brightly coloured. **Perianth**: tube campanulate, funnel-shaped, tubular or urceolate, often resembling a corolla, upper part mostly caducous after anthesis, lower part mostly persistent, enclosing mature fruit; lobes (3)4 or 5(–7), small, herbaceous, carnose, or petaloid, induplicate-valvate in bud, persistent, often accrescent, sometimes circumscissile above base. **Stamens** 1–10(–40); filaments mostly unequal, free or connate into a cup at base; anthers 2-thecous, tetrasporangiate, dehiscing by longitudinal slits, latrorse, partly introrse, almost basifixed, included or exserted. **Ovary** superior, 1-carpellate, 1-locular, sometimes stipitate; ovule 1, basal, stalked, erect, hemi-anatropous to anacampylotropous; integuments 2, rarely 1; style short to elongate, or rarely 0, filiform; stigma small, simple or multifid. **Fruit** an achene or thin-walled nutlet, enveloped by persistent, variously modified perianth base and forming a so-called anthocarp, or fruit rarely free, indehiscent, fleshy or coriaceous, often glandular and viscid, sometimes with prickles, occasionally ribbed or winged; pericarp inconspicuous. **Seed** 1, erect, exarillate; endosperm scanty; perisperm usually abundant, mealy, rarely gelatinous; embryo straight or hooked.

Genera ± 30, species ± 390, distributed in warmer parts of the world with concentration in the New World, also in Africa, Asia, Mascarene and Pacific Islands; sthn Afr.: genera 5 (1 exotic), species 20 (2 exotic). Species and varieties of *Bougainvillea* Comm. ex Juss. are widely cultivated in the warmer parts of sthn Afr.

Jussieu: 90 (1789) name conserved; Brown: 421 (1810); Choisy: 425 (1849); Hooker: 1 (1880); Heimerl: 14 (1889); Fiedler: 572 (1910); Heimerl: 86 (1934); Stemmerik: 450 (1964a); Bittrich & Kühn: 473 (1993); Mabberley: 494 (1997).

Key to genera

1a Herbs, sometimes woody towards the base:
  2a Flowers shorter than 20 mm; bracts small, free:
    3a Perianth funnel-shaped, slightly lobed; flowers relatively conspicuous; stamens well exserted ..... **Commicarpus**
    3b Perianth cylindrical, relatively small and inconspicuous; stamens slightly exserted ..... **Boerhavia**
  2b Flowers longer than 30 mm; bracts large, connate, forming a calyx-like involucre; branches soft and brittle ..... ***Mirabilis**
1b Shrubs, woody climbers or trees:
    4a Shrubs with spinescent branchlets; leaves linear, alternate and often fascicled; anthocarp winged ..... **Phaeoptilum**
    4b Woody climbers, shrubs or trees usually with hooked spines; leaves broad, mostly opposite, sometimes alternate or whorled; anthocarp with rows of stout, stipitate glands ..... **Pisonia**

Boerhavia L. 2349000

Linnaeus: 3 (1753) '*Boerhaavia*'; Linnaeus: 9 (1754); Jussieu: 91 (1789); Brown: 422 (1810); Choisy: 449 (1849); Hooker: 5 (1880); Heimerl: 26 (1889); Baker & Wright: 2 (1909); Cooke: 393 (1910); Standley: 204 (1918); Burtt Davy: 209 (1926); Heimerl: 117 (1934); Stemmerik: 452 (1964a) in part; Codd: 113 (1966); Schreiber: 1 (1969); Fosberg: 1 (1978); Stürton: 79 (1982); Stannard: 20 (1988); Bittrich & Kühn: 481 (1993); Thulin: 169 (1993); Whitehouse: 2 (1996).

Annual or perennial, erect or diffuse herbs, rarely woody at base, usually many-stemmed, sometimes viscid, raphides often present in all parts; stems slender, glabrous or pubescent, often with glandular rings about internodes. **Leaves** opposite, commonly in pairs of unequal size at each node, often fleshy, entire or repand, petiolate or sessile. **Inflorescences** terminal and axillary, paniculate, umbellate or cymose, sometimes diffuse, pedunculate; bracteoles 1 or 2, minute, caducous. **Flowers** bisexual, small, solitary or glomerate, subsessile to pedicellate, fugacious. **Perianth**: tube variable in length, lower portion constricted above ovary, cylindrical to obconical, upper portion petaloid, coloured, campanulate, caducous after anthesis, with lower part persistent and becoming hardened in fruit, sometimes glandular; lobes 5. **Stamens** 1–4(–6), exserted or included, unequal; filaments filiform, shortly connate below; anthers usually subglobular. **Ovary** ellipsoid, oblique, shortly stipitate; style filiform, exserted or included; stigma capitate or peltate. **Fruit** enclosed in lower portion of perianth (anthocarp); anthocarp fusiform, valvate or turbinate, conspicuously 3–5-sulcate, symmetrical, glabrous or glandular pubescent, often viscid; ribs rounded, acute or winged, usually mucous when wet. **Seed** with scanty endosperm; embryo hooked. $x = 13$ (polyploidy).

Species ± 20, in almost all tropical and subtropical areas of the world, mostly in North America; several are cosmopolitan weeds; 7 in sthn Afr., fairly widespread throughout warm, arid regions, often found in disturbed areas, Namibia, Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Northern, Western (only Beaufort-West District) and Eastern Cape.

Commicarpus Standl. 2347010

Standley: 373 (1909); Heimerl: 115 (1934); Webb: 111 (1964); Schreiber: 4 (1969); Meikle: 235 (1978); Stannard: 15 (1988); Bittrich & Kühn: 482 (1993); Whitehouse: 8 (1996).

Perennial herbs or subshrubs with long, slender, erect, climbing or reclining stems, often much branched and woody towards base. **Leaves** opposite in subequal pairs, often fleshy, usually entire or repand, raphides often visible on inferior surface in dried state, petiolate. **Inflorescences** umbellate, verticillate, irregularly branched or mixed, pedunculate. **Flowers** bisexual, small, usually pedicellate, fugacious; each pedicel bracteate; bracts caducous. **Perianth**: tube with few or many prominent glands on portion surrounding ovary; lobes 5. **Stamens** 2–5(6), exserted; filaments filiform, often unequal, connate into short sheath at base; anthers 2-thecous. **Ovary**

ellipsoid, often stipitate; ovule solitary; style filiform, long-exserted; stigma capitate. **Fruit** enclosed in persistent base of perianth (anthocarp); anthocarp cylindrical, fusiform, clavate or turbinate, ± 10-sulcate, studded with variously arranged, large, viscid, sessile or stipitate glands scattered over its surface. **Seed** with scanty endosperm; embryo hooked.

Species ± 32; mainly in Africa, except the extreme north and south, but also in warm regions of Europe (S Spain), Asia (Burma, Malaysia, South China), Australia, North and South America; 9 in sthn Afr., widespread in subtropical parts in arid habitats, in all the provinces and countries except Lesotho and Western Cape.

*Mirabilis L. 2347000

Linnaeus: 177 (1753); Linnaeus: 82 (1754); Choisy: 427 (1849); Hooker: 3 (1880); Heimerl: 24 (1889); Baker & Wright: 1 (1909); Cooke: 393 (1910); Heimerl: 108 (1934); Webb: 111 (1964); Stemmerik: 451 (1964a); Meikle & Hewson: 6 (1984); Stannard: 13 (1988); Bittrich & Kühn: 482 (1993); Le Duc: 613 (1995); Whitehouse: 15 (1996).

Perennial herbs; stems erect, semidecumbent or decumbent, simple or branched from base, with a pseudodichotomous branching pattern, glandular-pubescent or glabrous; nodes thickened; roots often tuberous. **Leaves** opposite, lower petiolate, upper sessile. **Inflorescences** axillary or terminal, cymose, 1–many-flowered compound dichasia. **Flowers** bisexual, large, sometimes fragrant, ephemeral; bracts forming a calyx-like involucre with 5 lobes; lobes acuminate. **Perianth**: tube campanulate, funnelform or salverform, constricted above ovary, limb spreading, plicate, sometimes enlarged and membranous in fruit, brightly coloured, white, red, yellow, or variegated, deciduous; lobes (4)5(–8). **Stamens** 2–6, unequal in length, exserted; filaments filiform, incurved, connate into a fleshy cup at base; anther thecae subglobose. **Ovary** sessile or subsessile, ellipsoid or ovoid; ovule erect; style filiform, long-exserted; stigma globose, with densely packed stalked papillae or fimbriate. **Fruit** enclosed in hardened base of perianth (anthocarp) and surrounded by persistent staminal cap; anthocarp ellipsoid, globose or claviform, often angled or ± 5–10-ribbed, smooth or tuberculate, not viscid. **Seed** filling pericarp to which testa adheres; perisperm mealy; embryo hooked. $x = 11$ (10) (aneuploids, polyploidy).

Species ± 60, almost exclusively in warmer parts of America, from California to Argentina; 1 in western Himalayas and SW China; 1 in Europe (an escape from cultivation); 2 introduced into sthn Afr., **Mirabilis jalapa* L., 'The Marvel of Peru', which is partly naturalised over a fairly wide area and **M. viscosa* Cav. only in Namibia.

Phaeoptilum Radlk. 2351000

Radlkofer: 435 (1883); Heimerl: 28 (1889); Baker & Wright: 9 (1909); Cooke: 396 (1910); Heimerl: 123 (1934); Schreiber: 6 (1969); Stannard: 28 (1988); Bittrich & Kühn: 483 (1993).

Nachtigalia Schinz ex Engl.: 128 (1894). *Amphoranthus* S.Moore: 305, 408 (1902).

Spiny, *Lycium*-like shrubs with long- and short shoots, densely branched, spreading; bark grey or yellowish. **Leaves** alternate or usually fascicled, sessile to subsessile, linear-cuneiform, ± fleshy, entire. **Flowers** bisexual or occasionally unisexual, solitary or in fascicles, usually on leafless branches; bracts small; bracteoles 0. **Perianth**: tube campanulate; lobes 4 or 5, ovate, spreading. **Male flowers** with 8 or 9 stamens, of two different lengths; the longer shortly exserted; filaments filiform, connate into short ± fleshy cup at base; anthers oblong-elliptic. **Female flowers** with very short stamens; ovary shortly stipitate; style asymmetrically inserted at apex of ovary, stout; stigma truncate, penicillate. **Fruit** enclosed in persistent, hardened, elongated perianth tube (anthocarp); anthocarp broadly 4- or 5-winged. **Seed** with hooked embryo.

Monotypic: *Phaeoptilum spinosum* Radlk., endemic to sthn Afr., frequent in hot, arid regions, Namibia, Botswana, Northern Province, Free State and Northern Cape.

Pisonia L. 2354000

Linnaeus: 1026 (1753); Linnaeus: 451 (1754); Jussieu: 91 (1789); Brown: 422 (1810); Choisy: 440 (1849); Hooker: 9 (1880); Heimerl: 29 (1889); Baker & Wright: 8 (1909); Cooke: 397 (1910); Heimerl: 126 (1934); Stemmerik: 457 (1964a); Stemmerik: 275 (1964b); Meikle & Hewson: 16 (1984); Stannard: 25 (1988); Bittrich & Kühn: 482 (1993).

Trees, shrubs, or somewhat scandent, with or without axillary spines; dioecious, rarely monoecious or flowers bisexual. **Leaves** mostly opposite, sometimes alternate or whorled, entire, petiolate. **Inflorescences** paniculate cymes, axillary or terminal, dense or lax, subsessile or pedunculate. **Flowers** unisexual (occasionally bisexual), small; bracts 2–4, not involucrate. **Male flower**: perianth infundibuliform, campanulate, urceolate or tubular, 5–10-lobed or -toothed; tube with viscid glands on ribs; lobes or teeth induplicate-valvate, erect, spreading or reflexed; stamens usually 5–10, mostly exserted; filaments connate below into a tube or ring. **Female flower**: perianth similar to male, but tube usually enlarged at base; stamens rudimentary; ovary sessile or stipitate, elongate; style filiform, included or exserted; stigma capitellate or peltate, pedicellate, multifid. **Fruit** enclosed in hardened, elongated, oblong or clavate, smooth or 4- or 5-angled perianth base (anthocarp); anthocarp coriaceous, with longitudinal rows of viscid stipitate glands. **Seed** with straight embryo. $x = 8$ (high polyploidy).

Species ± 50, cosmopolitan in tropical and subtropical regions, predominantly of America and SE Asia, with a few species in Africa and Australia; 1 in sthn Afr.: *Pisonia aculeata* L., N KwaZulu-Natal.

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Nymphaeaceae

(Magnoliidae—Nymphaeales)

Compiled by L.L. Dreyer & R.P. Glen

Aquatic, rhizomatous, perennial herbs rooted in bottom mud. **Leaves** spirally arranged on rhizome, usually round or oval, cordate, floating, rarely emergent or submerged, petiolate (petioles often very long), usually ± peltate, palmately veined, entire to dentate; stipules present. **Flowers** regular, bisexual, solitary, usually large, showy, often scented, mostly long-pedunculate, floating, emergent or rarely submerged. **Sepals** 4 (but ± sepaloid petals can be present), ± green. **Petals** 5–many, arising from successively higher levels on ovary, outermost usually equalling or shorter than sepals, innermost shorter and narrower, grading into stamens. **Stamens** many, spirally arranged, outer with broad petaloid filaments; filaments arising from top of ovary, often extending as a sterile appendage beyond anther thecae; anthers obtuse, opening by longitudinal slits, introrse. **Ovary** sunk in receptacle, syncarpous, many-locular; ovules many per locule, pendulous from walls or apex; stigmatic surfaces radiating from central apical boss of ovary, with marginal stylar processes. **Fruit** a large berry, fleshy or spongy, ripening under water, eventually splitting. **Seeds** many, small, floating due to air-containing, sack-like, pulpy aril; sinking to bottom and germinating when aril decays; endosperm scanty, perisperm copious. $x = 7$ (9) (high polyploidy).

Genera 6, species ± 60, cosmopolitan in tropical and subtropical climates; sthn Afr.: genus 1, species 2.

Harvey: 13 (1860); Friedrich-Holzhammer: 39 (1968); Verdcourt: 1 (1989); Cook: 131 (1990); Schneider & Williamson: 486 (1993); Thulin: 22 (1993).

Nymphaea L. 2513000

Linnaeus: 510 (1753); Harvey: 14 (1860); Mendonça: 175 (1960); Verdcourt: 1 (1989); Cook: 135 (1990); Schneider & Williamson: 491 (1993); Thulin: 23 (1993).

Description as for family.

Species ± 40 plus several hybrids, cosmopolitan in tropical and temperate climates; 2 in sthn Afr., widespread.

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Ochnaceae

(Dilleniidae—Theales)

Compiled by R.H. Archer

Trees, shrubs or shrublets; bark rough or smooth, sometimes flaking; with cortical vascular bundles in stem; occasionally with yellow pigment in bark. **Leaves** alternate, simple, discolorous, mostly glabrous, midrib prominent, penninerved and with reticulate veining and many closely spaced parallel lateral nerves, margin entire to serrate; stipules free or united and ± intrapetiolar, entire or laciniate, early caducous or persistent; axillary and apical buds generally elongated and covered by overlapping brownish scale leaves. **Flowers** bisexual, regular, often fragrant, in terminal or axillary panicles, racemes or fascicled cymes, or solitary; pedicels articulated at or near base. **Sepals** (4)5, free or nearly so, quincuncial, usually persistent and accrescent and often pinkish red in fruit. **Petals** (4)5, free, often shortly stalked, contorted in bud, fugaceous, mostly yellow, sometimes cream to white. **Stamens** few to many, free; filaments persistent; anthers 2-thecous, basifixed, linear, opening by longitudinal slits or apical pores, usually caducous. **Carpels** 5–15, 1-ovulate, superior, ± free, but united at least by their completely fused to apically free, gynobasic styles; stigmas terminal, usually somewhat enlarged. **Fruit**: 1-seeded drupelets on an enlarged receptacle. **Seeds** 1 per drupelet; with or without endosperm.

Genera ± 30, species ± 250, mostly pantropical; sthn Afr.: genera 2, species 13.

Robson: 224 (1963); Du Toit & Obermeyer: 1 (1976).

Key to genera

Stipules laciniate or deeply divided into linear segments, markedly longitudinally striate; leaves with lateral veins continuing upwards alongside margin; petals white or pink; yellow pigment present in bark ..... **Brackenridgea**

Stipules entire or fringed or bifid, not striate, deciduous; leaves with lateral veins not continuing upwards alongside margin; petals yellow or orange; yellow pigment in bark absent ..... **Ochna**

Brackenridgea A.Gray 5114000

Gray: 361, t. 42 (1854); Robson: 252 (1963); Du Toit & Obermeyer: 12 (1976).

Trees, shrubs or soboliferous dwarf shrubs, glabrous, forming a yellow pigment in the bark. **Leaves** shortly petiolate, with primary lateral nerves curving upwards, almost parallel to margin, margin closely serrulate with gland-tipped teeth; petioles short; stipules deeply divided into subulate segments, persistent at least on first-year shoots. **Flowers** variously arranged, usually in axillary fascicles or reduced to 1 flower; bracts resembling stipules. **Sepals** (4)5, imbricate in bud, white or pink in flower, enlarging and becoming red and coriaceous in fruit. **Petals** (4)5, white or pale pink, fugaceous. **Stamens** 10–20, free; filaments persistent, slender, ± as long as anthers; anthers opening by longitudinal slits, caducous. **Carpels** 5–10, 1-ovulate, attached basally to receptacle; style entire; stigma capitate. **Drupelets** globose, shiny-black, attached basally to the red swollen torus. **Seeds** without endosperm, embryo curved around an internal projection of the endocarp.

Species ± 12, SE Asia and Australia, 4 in Africa and Madagascar; 2 in sthn Afr., Namibia and Northern Province; usually in sandy soil.

Ochna L. 5112000

Linnaeus: 513 (1753); Robson: 224 (1963); Du Toit & Obermeyer: 1 (1976).

Trees or shrubs, or occasionally virgate, soboliferous shrublets; bark rough or smooth, sometimes flaking. **Leaves** semipersistent, shed in spring or in times of drought, usually shortly petiolate, ovate, obovate, oblong to linear, margin entire to serrate, midrib prominent on both sides, veins spreading, distinctly reticulate; stipules intrapetiolar, fused, bifid or bidentate. **Flowers** often fragrant, in terminal or axillary panicles or racemes or reduced to subumbellate, many- to few-flowered cymes or solitary, on short lateral spurs; pedicels articulated near base or in lower half, accrescent; bud scales or bracts distichous, caducous, leaving transverse scars on twigs. **Sepals** 5, quincuncial in bud, green or yellow, persistent, enlarging and usually turning red or pink in fruit, firm, enveloping bud and usually young fruit, but spreading at anthesis and when fruit is ripe. **Petals** 5, yellow, orange or rarely white, usually obovate, attenuate or clawed at base, fugaceous. **Stamens** 30–40, free, irregularly placed in a dense whorl on torus; filaments filiform, persistent, apex slightly capitate; anthers bilocular, opening by longitudinal slits or apical pores, basifixed, caducous. **Carpels** 5–15, 1-ovulate, attached basally or laterally to the receptacle; styles gynobasic, completely united or upper ends free, recurved; stigmas apical, as many as carpels or fused and capitate. **Drupelets** 1–several, some usually aborting, 1-seeded, kidney-shaped, usually hard, black and shiny, attached basally to swollen, often red receptacle. **Seed** ± reniform to straight, without endosperm and without internal projection of endocarp. $x = 7$ (polyploidy).

Species ± 86, Africa, Mascarenes and Asia; 12 in sthn Afr., widespread but absent from the winter-rainfall region.

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Olacaceae

(Rosidae—Santalales)

Compiled by M. Jordaan

Trees, shrubs, or woody climbers, sometimes spinescent, sometimes hemiparasitic. **Leaves** usually alternate, petiolate, simple, entire, mostly pinnately veined; stipules 0. **Inflorescences** axillary, short racemes and panicles or elongated spikes, often fascicles or glomerules, rarely reduced to a solitary flower. **Flowers** bisexual, regular, hypogynous, cyclic, rarely heterostylous, small. **Calyx** cup-shaped with margin ± entire or 3–5(6)-lobed, small, with base free or usually partially connate and ± adnate to ovary. **Petals** 3–5(6), free or variously connate, valvate in bud, much larger than calyx. **Stamens** 3–8(10), opposite petals, if equal in number to them, free or adnate to them at base, sometimes with up to 12 staminodes, hypogynous; anthers 2-thecous, longitudinally dehiscent by means of a slit or more rarely an apical pore, basi- or medifixed. **Disc** various, often annular. **Ovary** superior, usually 1-locular near top but 1–3(–5)-locular at base; ovules 1–4 per locule, anatropous, pendulous from apex of a free central placenta, or from inner angle of 2–more-locular ovaries; style usually short, simple or conical, columnar or filiform; stigma 2–5-lobed, subsessile. **Fruit** a drupe with a thin and often fleshy, sometimes dehiscent or caducous exocarp, and a crustaceous to woody endocarp, or concrescent with the cup-shaped floral axis, or with an accrescent calyx or disc which then forms an external fleshy layer. **Seed** 1; testa thin; endosperm copious, starchy and/or oily, bearing the very small embryo at its apex.

Genera 25; species 250, predominantly in the tropics, a few in the subtropics of Old and New World; sthn Afr.: genera 2, species 3.

Mirbel: 377 (1813); Candolle: 531 (1824); Bentham: 342 (1862); Engler: 231 (1889); Sleumer: 22 (1935).

Key to genera

Calyx cup-shaped, truncate, enlarged in fruit; branchlets not spinescent ..... **Olax**

Calyx 4- or 5-toothed or -lobed; not enlarged in fruit; shrubs or small trees with aborted, spinescent branchlets ..... **Ximenia**

Olax L. 2131000

Linnaeus: 34 (1753); Linnaeus: 20 (1754); Brown: 357 (1810); Bentham: 347 (1862); Oliver: 348 (1868); Engler: 239 (1889); Sleumer: 24 (1935); Garcia: 331 (1963); Friedrich-Holzhammer: 1 (1967); Lucas: 6 (1968); Garcia & Vidigal: 5 (1979).

Small trees or shrubs; branchlets usually slightly ridged, glabrous to poorly scabrid. **Leaves** alternate, often distichous, articulated with branches, sometimes small and squamiform, penninerved, glabrous. **Inflorescence** a short, axillary spike or raceme, rarely flowers solitary; peduncle simple, rarely branched; pedicels articulate at their base. **Calyx** cup-shaped, margin ± undulate, small in flower, but enlarging and almost enclosing fruit. **Petals** 3 or 5(6), arising on a disc, free or slightly cohering, valvate, linear-spathulate, glabrous on inner surface, apiculate. **Stamens** 3–6; filaments flattened, ± adnate to petals; anthers oblong; staminodes 5–12, 2-fid or -partite. **Ovary** 1–3-locular at base, borne on a circular disc; ovules 1 per locule; style simple, relatively short; stigma capitate and (1–)3- or 4-lobed or subcapitate. **Fruit** a globose or ellipsoid drupe, almost wholly enclosed by accrescent calyx; pericarp parenchymatose. **Seed** with fleshy endosperm, containing oily substances. $x = 6$ (polyploidy).

Species ± 40, palaeotropical, Africa, Madagascar, tropical Asia to Australia, 10 species in Africa; 1 in sthn Afr.: *Olax dissitiflora* Oliv., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Ximenia L. 2136000

Linnaeus: 1193 (1753); Linnaeus: 500 (1754); Sonder: 235 (1860); Bentham: 346 (1862); Oliver: 346 (1868); Engler: 237 (1889); Sleumer: 22 (1935); Schweickerdt: 179 (1937); Garcia: 329 (1963); Friedrich-Holzhammer: 2 (1967); Lucas: 3 (1968); De Filipps: 193 (1969); Villiers: 106 (1973); Garcia & Vidigal: 1 (1979).

Trees or shrubs, glabrous or tomentose, sometimes hemiparasitic on roots; branches usually armed with spines; brachyblasts often ending in thorns. **Leaves** alternate, sometimes fascicled on brachyblasts, penninerved. **Inflorescences** axillary or at end of brachyblasts, in few- to many-flowered, peduncled, sometimes umbellike, cymes or in fascicles, rarely solitary; bracts small. **Calyx** cupular-expanded, 4- or 5-toothed or -lobed, small, persistent, not accrescent in fruit. **Petals** 4 (rarely 5), free, hypogynous, bearded within, valvate in bud, linear-oblong, finally revolute ± halfway, with a brush of hairs on inner surface, glabrous to sparsely pubescent on outer surface. **Stamens** 8 (rarely 10), free, hypogynous, opposite petals and alternating with them; filaments filiform, flattened; anthers linear-oblong to subovate, basifixed, 2-thecous, erect, longitudinally dehiscent, connective thick; staminodes 0. **Ovary** sessile, 3- or 4-locular at least at base; ovules 3 or 4, anatropous, bitegmic; style narrowly conical, grooved, shortly divided at apex; stigma capitate. **Fruit** a large, ovoid or globose drupe; pericarp thin and pulpy, edible but kernel contains a strong purgative. **Seed** with copious endosperm, containing oily substances. $x = 12, 13$ (1 report each).

Species ± 8, 1 pantropical, 2 in eastern tropical and sthn Afr., the rest in America; 2 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland and KwaZulu-Natal.

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Oleaceae

(Asteridae—Scrophulariales)

Compiled by J.E. Victor

Trees, shrubs, climbers or occasionally low, woody-based, herbaceous plants. **Leaves** opposite or sometimes alternate, simple or compound, sometimes acarodomatia present on lower surface in axils of veins; stipules 0. **Inflorescence** cymose, usually paniculate or occasionally appearing fascicled or only one flower developing. **Flowers** regular, bisexual, or rarely unisexual, sometimes with heterostylous arrangement. **Calyx** shortly or deeply 4–15-lobed. **Corolla** gamopetalous, 4- or more-lobed, sometimes lobed almost to base. **Stamens** 2, rarely 4, epipetalous; anthers opening by longitudinal slits. **Ovary** superior, 2-locular, with 2–4 axile, pendulous or ascending ovules in each locule; style simple. **Fruit** dry or fleshy, dehiscent or indehiscent. **Seeds** sometimes winged; with or without endosperm; embryo straight.

Genera ± 25, species ± 600, cosmopolitan in tropical and temperate areas; sthn Afr.: genera 5, species 22. 4 species of **Ligustrum* (6436000) are becoming potentially problematic escapes mainly along water courses in the Sabie-Graskop regions of Mpumalanga, and in the Pretoria (Gauteng) and Pietermaritzburg (KwaZulu-Natal) areas, and around Rhodes in Eastern Cape.

Harvey: 478 (1906/1907); Kupicha: 300 (1983); Verdoorn: 100 (1963).

Key to genera

1a Fruit a woody capsule; corolla salver-shaped, tube well developed, lobes spreading, with a group of swollen hairs at base of lobes ..... **Schrebera**

1b Fruit a drupe, berry or membranous capsule; corolla lobes without a group of swollen hairs:

2a Fruit a drupe or berry; trees, shrubs or scramblers; corolla white to pink or cream:
3a Corolla tube short or absent:
4a Leaves on flowering branches usually with acarodomatia; calyx deeply lobed; inflorescence few-flowered; seeds without endosperm ..... **Chionanthus**
4b Leaves without acarodomatia; calyx toothed or shallowly lobed; inflorescence many-flowered; seeds with endosperm ..... **Olea**
3b Corolla tube long and slender, lobes spreading abruptly; scramblers or bushy shrubs ..... **Jasminum**
2b Fruit a membranous capsule; shrublets or perennial herbs; corolla yellow, often with reddish tinge ..... **Menodora**

Chionanthus L. 6428000

Linnaeus: 8 (1753); Kupicha: 320 (1983).

Linociera Sw.: 784 (1791); Verdoorn: 119 (1963).

Trees, small or large. **Leaves** opposite, entire, minutely and sparsely lepidote, at least on lower surface, with acarodomatia in axils of veins on lower surface. **Inflorescence** axillary on new or 1-year old twigs; cymes occasionally sessile, more often paniculate and laxly flowered, occasionally peduncles and pedicels reduced and flowers appearing glomerate. **Calyx** deeply 4-lobed, sometimes to base. **Corolla** with short tube or 4-lobed to base; lobes with margins deeply infolded, white, often tinged pink, or cream. **Stamens** 2(4); anthers basifixed. **Ovary** subglobose; stigma subcapitate, obscurely bilobed; ovules collateral. **Fruit** a drupe with thin, fleshy layer; endocarp rather hard, with large seed cavity. **Seeds** usually solitary, without endosperm. $x = 23$.

Species ± 120, in tropics and subtropics of America, Africa and Asia, and also on certain islands in these regions; 3 in sthn Afr., widespread except in Namibia, Botswana, Free State, Lesotho and Northern Cape.

Jasminum L. 6440000

Linnaeus: 7 (1753); Harvey: 479 (1906/1907); Verdoorn: 103 (1963); Kupicha: 305 (1983).

Climbing, scrambling or erect shrubs or shrublets. **Leaves** usually opposite, compound or reduced to one leaflet, digitately or pinnately 3- or more-foliolate. **Inflorescence** consisting of a solitary flower or a few-flowered, simple or compound cyme, terminal on main and lateral branchlets, sometimes axillary as well. **Flowers** often heterostylous, often sweetly scented. **Calyx** tube campanulate; lobes 4–13, often long and subulate. **Corolla** tube long and slender; lobes 4–11, imbricate, spreading abruptly; white or yellow, sometimes flushed with rose. **Stamens** 2, arising ± midway or near top of tube, not exserted; filaments short. **Ovary** 2-locular, with 2, rarely more, ovules in each locule, attached near base, usually only one ovule developing; style slender; stigma clavate or bilobed. **Fruit** a 2-seeded berry, deeply bilobed, usually one lobe aborting. **Seeds** without endosperm. $x = 13$ (aneuploids, polyploidy).

Species ± 450, Asia, Africa and Australia; 10 in sthn Afr., widespread excluding Lesotho.

Menodora Bonpl. 6438000

Bonpland: 98, t. 110 (1809); Harvey: 483 (1906/1907); Verdoorn: 125 (1963); Kupicha: 318 (1983).

Perennial, suffruticose or subherbaceous from a woody base, erect or diffuse, with a strong taproot. **Leaves** opposite, subopposite or alternate, simple or divided. **Inflorescence** cymose, paniculate or sometimes reduced to a single flower and then with monochasial development. **Calyx** persistent, united at base, with 5–10 lobes; lobes sometimes cleft. **Corolla** united; tube usually half length of lobes, usually pilose within at insertion of stamens; lobes usually 5, imbricate; yellow, often with reddish tinge. **Stamens** 2; filaments arising on tube and decurrent to its base, free above and exserted; anthers attached near base, erect, oblong. **Ovary** 2-lobed, 2-locular; ovules 2–4 in each locule, collateral, attached ± midway to wall of partition. **Fruit** a bilocular capsule, with circumscissile dehiscence, usually both cocci developing. **Seeds** 1–4 in a coccus, reticulated; without endosperm. $x = 11$ (polyploidy).

Species ± 25, America and sthn Afr.; 3 in sthn Afr., widespread.

Olea L. 6434000

Linnaeus: 8 (1753); Harvey: 485 (1906/1907); Verdoorn: 112 (1963); Green & Kupicha: 69 (1979); Kupicha: 323 (1983).

Shrubs or trees up to large size. **Leaves** opposite, entire, scurfy-scaly, sometimes minutely and sparsely so. **Flowers** in trichotomously branched, many-flowered, axillary or terminal panicles. **Calyx** persistent, cupular, 4-toothed or shortly 4-lobed. **Corolla** with short tube, 4-lobed, white. **Stamens** 2, arising on corolla tube; anthers dorsifixed with extrorse dehiscence. **Ovary** subglobose; stigma bilobed; ovules 2, pendulous. **Fruit** a drupe, with thin, fleshy mesocarp; endocarp rather hard, with large seed cavity. **Seeds** usually solitary, with endosperm. $x = 23$.

Species ± 50, Mediterranean region, Africa, Asia and Mascarene Islands; 4 in sthn Afr., widespread.

Schrebera Roxb. 6422000

Roxburgh: t. 101 (1798); Harvey: 482 (1906/1907); Verdoorn: 100 (1963); Kupicha: 301 (1983).

Trees or shrubs. **Leaves** opposite, compound; rachis usually winged. **Flowers** heterostylous; in paniculate cymes. **Calyx** campanulate, loosely enveloping corolla, truncate or irregularly and obscurely lobed. **Corolla** salver-shaped, white, sometimes tinged with pink or puce; tube well developed, cylindrical; segments 6–more, spreading to reflexed, each with a group of swollen, brown to purplish hairs at base. **Stamens** 2, arising on corolla, either in throat with anthers exserted, or a little below throat with anthers included; filaments short; anthers large, introrse. **Ovary** small, truncate or obscurely bilobed at apex; ovules 4 in each locule; style filiform; stigma included or exserted, subcapitate or oblong in outline. **Fruit** a bivalved, woody capsule, with loculicidal dehiscence. **Seeds** produced into a long, subapical wing; with endosperm. $x = 23$ (11) (polyploidy).

Species ± 10, Africa and India; 2 in sthn Afr., Botswana, Namibia, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal.

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Oliniaceae

(Rosidae—Myrtales)

Compiled by R.H. Archer

Trees or shrubs, with 4-angled branchlets. **Leaves** opposite, petiolate, simple, entire, obovate, elliptic or lanceolate, often acuminate, glabrous, often smelling of almonds when crushed (a cyanogenic glycoside); stipules rudimentary. **Flowers** bisexual, regular, small, in short, axillary, trichotomous cymes, arranged in lax racemes, shorter than subtending leaf; bracts opposite, up to length of flowers, often deciduous. **Calyx** 4- or 5-lobed on rim of tube/hypanthium, conspicuous, often considered to be petals, obovate- or linear-spathulate, white or pinkish, usually pubescent at base; tube/hypanthium adnate to ovary and slightly exceeding it. **Petals** (4)5, arising in throat of calyx tube, minute, scale-like (perhaps not representing petals), alternating with, and much shorter than sepals, incurved and closing tube in bud, spreading and reflexed at anthesis exposing stamens, valvate, usually pink, pubescent. **Stamens** (4)5, arising in calyx tube below petals; filaments very short; anthers small, didymous, 2-thecous, opening by longitudinal slits. **Ovary** inferior, of (3)4 or 5 fused carpels, 3–5-locular, with ± 3 pendulous, superposed, hemitropous, bitegmic ovules on axile placentas in each locule; style straight; stigma thickened. **Fruit** a false drupe, thinly fleshy, globose, about the size of a pea, red to reddish brown, marked by a circular scar left by deciduous hypanthium; with 1 seed per locule. **Seeds** somewhat obovoid, with thick, brown, warty testa; cotyledon spiral or irregularly folded; endosperm 0. $x = 10$ (aneuploids, polyploidy).

Genus 1, species 8–10, eastern and sthn Afr.

Hofmeyer & Phillips: 97 (1922); Dahlgren & Van Wyk: 40 (1988).

Olinia Thunb. 5428000

Thunberg: 4 (1800); Sonder: 519 (1862); Hofmeyer & Phillips: 97 (1922); Burtt Davy: 47, 200 (1926); Sebola & Balkwill: 97 (1999).

Description as for family.

Species 8–10, Africa; 5 in forest and forest margins, Northern and North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

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Onagraceae

(Rosidae—Myrtales)

Compiled by C.L. Bredenkamp

Annual, biennial, or perennial herbs, sometimes aquatic. **Leaves** opposite or alternate, simple, entire or variously lobed; stipules usually present or 0. **Flowers** bisexual, usually regular, mostly solitary and axillary, subtending leaves sometimes greatly reduced or 0. **Sepals** (2–)4 or 5(–7); lobes valvate; free floral tube (hypanthium, perianth tube) present or 0. **Petals** as many as sepals, or 0, free, caducous. **Stamens** as many or twice as many as sepals; anthers oblong or linear, introrse, versatile, opening by longitudinal slits. **Ovary** inferior, locules as many as sepals, with 1–many ovules in each locule; placentation axile; style single, terete, often thick; stigma entire or deeply lobed. **Fruit** a capsule or nut, often elongated. **Seeds** terete or prismatic-angled, smooth or papillose, with a terminal tuft of hairs in *Epilobium*.

Genera 17, species 674, cosmopolitan in tropical and temperate areas, but mostly America; sthn Afr.: genera 4 (2 introduced and naturalised), species 27 (mostly introduced and naturalised).

Harvey: 503 (1862); Schreiber: 1 (1967); Raven: 329 (1978); Goldblatt & Raven: 149 (1997).

Key to genera

1a Floral tube 0; sepals persistent in fruit after petals have fallen; petals lacking, or if present, yellow ..... **Ludwigia**

1b Floral tube present; sepals not persistent in fruit, falling with the floral tube; petals yellow, rose-purple, or white:

2a Flowers irregular; petals white; fruit nut-like, indehiscent, with 2–8 ovules ..... ***Gaura**

2b Flowers regular; petals yellow, rose-purple, or white; fruit a dehiscent capsule, with many ovules:

3a Seeds with an evident tuft of hairs (coma); petals rose-purple or white; capsule slender, > 10 times as long as broad; basal leaves opposite ..... **Epilobium**

3b Seeds lacking a coma; petals yellow, rose-purple or white; capsule clavate or elongate, < 10 times as long as broad; all leaves alternate ..... ***Oenothera**

Epilobium L. 5795000

Linnaeus: 347 (1753); Harvey: 506 (1862); Raven: 309 (1967); Goldblatt & Raven: 153 (1997).

Perennial herbs, often flowering in first year. **Leaves** alternate above, opposite below, simple, entire or toothed; stipules 0. **Flowers** regular, borne in axils of reduced upper leaves, their opening not highly synchronised. **Sepals** 4, caducous; floral tube present. **Petals** 4, rose-purple to white, notched. **Stamens** 8; anthers linear to oblong; pollen shed in tetrads. **Ovary** with many uniseriate ovules in each locule; stigma entire or 4-lobed. **Fruit** a slender loculicidal capsule. **Seeds** ellipsoid, brown, with a terminal tuft of hairs (coma). $x = 9$ (13) (high polyploidy, B-chromosomes).

Species 185, with a centre of diversity in North America, 10 in Africa; 4 in sthn Afr., Namibia, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

*Gaura L. 5819000

Linnaeus: 347 (1753); Linnaeus: 163 (1754); Goldblatt & Raven: 156 (1997).

Gauridium Spach: 379 (1835a). *Schizocarya* Spach: 325, 381 (1835b); Spach: 170, 283 (1835c).

Annual, biennial, or perennial herbs. **Leaves** alternate, entire to deeply lobed; stipules 0. **Inflorescence** a spicate raceme, sharply delimited, not leafy, ± conspicuously pedunculate. **Flowers** usually strongly irregular, borne in axils of much reduced upper leaves (bracts), opening either near sunset or near sunrise and fading within a day. **Sepals** 4, caducous; floral tube present, long and narrow. **Petals** 4, white, usually sharply clawed, entire. **Stamens** 8; anthers linear, sporogenous tissue divided by sterile tissue into discrete packets; pollen shed singly. **Ovary** with 1 or 2 ovules in each locule; stigma deeply 4-lobed. **Capsule** indehiscent, nutlike, with hard, woody walls, septa incomplete and fragile, not evident at maturity. **Seeds** ovoid, yellowish to pale brown. $x = 7$ (high polyploidy).

Species 21, North America, centring in the Great Plains and Texas; 2 naturalised in sthn Afr., North-West, Gauteng, Mpumalanga, Free State, Western and Eastern Cape.

Ludwigia L. 5793000

Linnaeus: 118 (1753); Harvey: 504 (1862); Raven: 327 (1963); Raven: 333 (1978); Goldblatt & Raven: 149 (1997).

Jussiaea L.: 388 (1753); Harvey: 504 (1862).

Annual or perennial herbs or undershrubs, sometimes prostrate, often associated with water. **Leaves** opposite or alternate, usually entire; stipules present, often much reduced. **Flowers** regular, borne in axils of reduced upper leaves, their opening not highly synchronised. **Sepals** 3–7, persistent after petals have fallen; floral tube 0. **Petals** as many as sepals or 0, yellow, usually entire. **Stamens** as many as or twice as many as sepals; anthers ovoid or oblong; pollen shed in tetrads or singly. **Ovary** with many pluriseriate or uniseriate ovules in each locule; stigma entire. **Capsule** terete or 4- or 5-ribbed, -angled, or -winged, irregularly loculicidal. **Seeds** ellipsoid, lacking hairs, free or embedded in endocarp at maturity, light brown. $x = 8$ (polyploidy).

Species ± 85, worldwide, mainly South America, relatively few in Africa; 7 in sthn Afr., in Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

*Oenothera L. 5804000

Linnaeus: 346 (1753); Harvey: 505 (1862); Munz: 79 (1965); Dietrich: 425 (1977); Raven: 330 (1978); Dietrich & Raven: 29 (1985); Frean *et al.*: 449 (1997); Goldblatt & Raven: 157 (1997).

Annual, biennial, or perennial herbs. **Leaves** alternate, entire to pinnatifid; stipules 0. **Flowers** regular, borne in axils of reduced leaves, often clustered near ends of stems, opening either near sunset or near sunrise and usually fading within a day. **Sepals** 4, caducous, floral tube present. **Petals** 4, yellow, white or rose-purple, usually entire. **Stamens** 8; anthers linear; pollen shed singly. **Ovary** with many pluriseriate or uniseriate ovules in each locule; stigma deeply 4-lobed. **Capsule** stout, loculicidal. **Seeds** lacking hairs, not embedded in endocarp, usually brown. $x = 7$ (high polyploidy, B-chromosomes).

Species ± 125, all native to North and South America, but widely naturalised in the Old World; 14 in sthn Afr., in all countries and provinces.

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Opiliaceae

(Rosidae—Santalales)

Compiled by M. Jordaan

Woody climbers, erect shrubs or small evergreen trees. **Leaves** alternate, distichous, simple, entire, penninerved, veins often prominent underneath; petiole short, articulated at base; dried leaves finely tubercled by cystoliths in mesophyll; stipules 0. **Inflorescences** axillary, fasciculate in catkin-like racemes; bracts broadly ovate to orbicular, caducous. **Flowers** bisexual, regular, small, solitary or in groups of 2 or 3 in axil of bract, sweet-scented. **Calyx** minute, annular. **Petals** 4 or 5, free, valvate in bud, may be taken for sepals due to reduction of sepals. **Stamens** 4 or 5,

opposite petals; anthers 2-thecous, introse, longitudinally dehiscent. **Disc** with 4 or 5 fleshy lobes alternating with stamens. **Ovary** superior, fusiform, free or almost so, 1-locular; ovule solitary, unitegmic and tenuinucellar, anatropous, pendulous from apex of a central placenta; style none or short; stigma entire or shallowly lobed. **Fruit** a drupe; pericarp rather thin; mesocarp ± fleshy-juicy; endocarp woody or crustaceous. **Seeds** large, conforming to the drupe; hilum basal, in a funnel-shaped cavity; embryo straight, terete, embedded in rich, oily endosperm, nearly as long as seed or shorter, with 3 cotyledons. $x = 10$ (1 report).

Genera 9, species 28; pantropical; 5 genera are only known from the eastern Old World (tropical Asia, Malesia and Australia); 2 genera occur in tropical Africa; 1 genus with 1 species in sthn Afr.

Bentham: 345 (1862), under Olacineae; Valeton: 1 (1886), under Opiliaceae (name conserved); Engler: 231 (1889); Engler: 171 (1909); Sleumer: 33 (1935); Hiepko: 161 (1982).

Opilia Roxb. 2122000

Roxburgh: 31, t.158 (1802); Bentham: 350 (1862); Oliver: 352 (1868); Engler: 240 (1889); Engler: 171 (1909); Sleumer: 38 (1935); Garcia: 336 (1963); Heine: 20 (1967); Lucas: 1 (1968); Hiepko: 161 (1982).

Description as for family.

Species 2 (with 2 additional varieties) in tropical Africa, 1 species extending to tropical Asia, the Solomon Islands, N Australia; 1 in sthn Afr.: *Opilia campestris* Engl. var. *campestris*, N Namibia.

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Oxalidaceae

(Rosidae—Geraniales)

Compiled by L.L. Dreyer & A.M. Makwarela

Stemless or caulescent herbs, mostly with bulbs, sometimes with contractile roots; sometimes annual and with fibrous roots. **Leaves** alternate or basal, palmately or pinnately compound, rarely 1-foliolate; leaflets often folded together at night; with or without stipules. **Inflorescence** cymose, sometimes umbellate or peduncles 1-flowered. **Flowers** bisexual, regular, usually with tristyly, rarely cleistogamous. **Sepals** 5, free, imbricate or occasionally valvate. **Petals** 5, clawed, mostly weakly united at base, imbricate or valvate, often contorted. **Stamens** 10 in 2 whorls; filaments slightly connate at base; anthers 2-thecous, dehiscing inwards with longitudinal slits. **Ovary** superior, 5-locular, 5-lobed, with 1–many ovules per locule on axile placentas; styles (1–)5, free; stigmas terminal, capitate, penicillate. **Fruit** a 5-lobed capsule, ejecting seeds explosively. **Seeds** 1–many, with or without endosperm.

Genera ± 7, species ± 900, Africa, Madagascar, Asia and America; sthn Afr.: genera 2, species ± 270.

Sonder: 312 (1860); Exell: 149 (1963); Schreiber: 1 (1966); Thulin & Moggi: 193 (1993).

Key to genera

Leaves digitately 3–many-foliolate or pinnately 3-foliolate, rarely 1-foliolate ..... **Oxalis**

Leaves paripinnate ..... **Biophytum**

Biophytum DC. 3937000

Candolle: 689 (1824); Exell: 156 (1963); Schreiber: 1 (1966).

Herbs, annual or perennial with woody rootstock; with or without stems. **Leaves** usually in rosettes at apex of stems or at ground level, paripinnate (abortive, terminal leaflet bristle-like), ± sensitive to touch, usually articulated slightly above insertion; leaflets opposite or subopposite, shortly petiolulate or subsessile. **Flowers** in pseudo-umbels, with bracts forming an involucre. **Sepals** 5, free, imbricate. **Petals** 5, contorted, free at first, later coherent and falling together. **Stamens** 10, 5 longer, 5 shorter, all slightly connate at base. **Ovary** 5-locular, 5-lobed. **Fruit** an obovoid, subglobose or ellipsoid, loculicidally dehiscent capsule. **Seeds** usually tuberculate. $x = 9$, 10 (1 report each).

Species 8, tropical and subtropical Africa and Madagascar; 2 in sthn Afr., Namibia.

Oxalis L. 3936000

Linnaeus: 433 (1753); Sonder: 313 (1860); Salter: 1 (1944); Schreiber: 2 (1966); Thulin & Moggi: 193 (1993).

Annual or perennial herbs, often with corms, tubers or tuberous roots, sometimes caulescent, rarely undershrubs, shrubs or trees. **Leaves** alternate or basal, digitately 3–many-foliolate or pinnately 3-foliolate, rarely 1-foliolate; leaflets entire to obcordate-bilobed; stipules present or 0; peduncles usually axillary. **Flowers** single or subumbellate, regular. **Sepals** 5, imbricate, free or united at base. **Petals** hypogynous, convolute with claws united into a tube. **Stamens** 10, in 2 series; outer smaller and opposite sepals; inner opposite petals. **Ovary** 5-locular, 5-lobed, with 1–many ovules per locule; styles 5, distinct; stigmas terminal, capitate or penicillate. **Capsule** loculicidally dehiscent. **Seeds** 1–several per locule. $x = 5, 6, 7, 8$ (9, 10, 11, 13, 17) (polyploidy).

Species ± 500, cosmopolitan with centres of diversity in South America and South Africa; ± 270 in sthn Afr., widespread but mainly in Namibia, Western and Eastern Cape.

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Papaveraceae

(Magnoliidae—Ranunculales)

Compiled by M. Jordaan

Annual, biennial or perennial herbs, glabrous or variously hairy or glandular-hairy, sometimes prickly, usually from taproots, with clear, white, yellow or orange-coloured, often sticky, latex in laticifers in all parts except seeds. **Leaves** alternate, basal and/or cauline, simple or multifid, pinnately veined, entire to much divided, petiolate or sessile with sometimes amplexicaul base, sometimes spiny; stipules 0. **Inflorescences** axillary or terminal, sometimes cymose but usually flowers solitary; bracts usually present. **Flowers** bisexual, regular, hypogynous, rarely perigynous (**Eschscholzia*), conspicuous and large, pedicellate or sessile; buds erect or often nodding before anthesis. **Sepals** 2 or 3, in 1 whorl, free, rarely connate, usually caducous. **Petals** 4–6(–8), free, usually in 2 whorls of 2 or 3, usually caducous, spreading, imbricate and often crumpled in bud, white, yellow, red, pink or purple. **Stamens** many, free, arising centripetally; filaments filiform, clavate or laterally expanded; anthers 2-thecous, tetrasporangiate, basifixed, opening lengthwise, erect. **Ovary** superior, of 2–24 fused carpels, sometimes carpels with free tips, 1- or 2-locular or rarely multilocular by intrusion of placentas; ovules many, on parietal placentas, anatropous to subcampylotropous, bitegmic, crassinucellate; style 0 or short; stigmas often sessile, as many as carpels and placentas, radiating. **Fruit** a dehiscent capsule, opening by valves or pores. **Seeds** usually many, small, with crested or smooth raphe; testa often sculptured; endosperm oily or rarely granular; embryo often ± rudimentary.

Genera ± 23, with ± 240 species, distributed mainly in temperate areas of the northern hemisphere of both the Old and New World, and extending into Central and South America; sthn Afr.: genera 4 (3 exotic), species ± 8 (only 1 indigenous). Many species of Poppy (*Papaver* L.) are cultivated as ornamentals and a few species have escaped and become very locally established. Two species of **Argemone* are well established aliens.

Jussieu: 235 (1789); Bentham: 49 (1862); Fedde: 1 (1909); Fedde: 5 (1936); Brückner: 361 (1983); Kadereit: 494 (1993).

Key to genera

1a Ovary of 2 carpels:
  2a Sepals connate into a cap or calyptra (hood), deciduous as a unit ..... ***Eschscholzia**
  2b Sepals free, separately deciduous ..... ***Glaucium**
1b Ovary of more than 2 carpels:
  3a Flower buds erect; corolla creamy white or yellow; sepals with conspicuous stiff apical processes; capsule opening by slits; seeds orbicular ..... ***Argemone**
  3b Flower buds drooping; corolla red, pink or purple; sepals without stiff apical processes; capsule opening by pores beneath the stigmas; seeds irregularly angular to ellipsoid, ovoid, oblong, falcate or reniform ..... **Papaver**

*Argemone L. 2852000

Linnaeus: 508 (1753); Linnaeus: 225 (1754); Bentham: 52 (1862); Oliver: 54 (1868); Prain: 130 (1895); Fedde: 105 (1936); Ownbey: 1 (1958); Exell: 180 (1960); Ownbey: 91 (1961); Lucas: 1 (1962); Henderson & Anderson: 144 (1966); Exell & Gonçalves: 1 (1973); Sorarú: 445 (1976); Kadereit: 504 (1993); Lidén: 5 (1995); Ownbey: 314 (1997).

Annual or biennial herbs, caulescent, from persistent taproots; sap white to orange; stems glaucous, erect, unarmed to prickly. **Leaves** sessile or clasping at base, cauline, alternate, glaucous, pinnately lobed or incised with a dentate prickly margin, and often prickly surface, often mottled over veins, glabrous. **Inflorescences** terminal, usually 1-flowered, bracteate. **Flowers** hypogynous; buds erect. **Sepals** 2 or 3, unarmed or prickly, each prickle with conspicuous stiff apical horns; outer surface usually sparsely prickly. **Petals** 4–6(–8), in 2 whorls of 3, large, obovate, creamy white or yellow. **Stamens** 20–many; filaments filiform. **Ovary** of (3)4–6(7) carpels, 1-locular, ovoid to ellipsoid, mostly distinctly bristly, rarely glabrous, placentas often intruding; style short; stigma 3–5(–7)-lobed. **Fruit** an erect capsule, armed with needle-like prickles, opening from apex basipetally by 4–6 valves, up to third of total length, rarely almost towards base; valves separating from framework of vascular elements,with remains of persistent style and stigma still attached to vascular framework. **Seeds** many, subglobose, sculptured, brown-black, narrowly crested and with a short apical point; embryo larger than in other genera, ± two-thirds of seed length. x = 14 or 7 (polyploidy).

Species ± 23, native to North America, the West Indies, Central and South America, 1 species endemic to Hawaiian Islands; 2 naturalised in sthn Afr., widespread in all provinces and countries.

*Eschscholzia Cham. 2840000

Chamisso: 73 (1820); Chamisso & Schlechtendal: 553 (1826); Bentham: 54 (1862); Meikle: 85 (1977); Kadereit: 503 (1993); Lidén: 11 (1995); Clark: 308 (1997).

Petromecon Greene (1905).

An erect or sprawling, glabrous, glaucous annual or perennial herb with a thick taproot; sap colourless or clear orange. **Leaves** basal and sometimes cauline, multifid or rarely linear, petiolate. **Inflorescences** terminal, usually 1-flowered, bracteate. **Flowers** perigynous, long-pedunculate. **Receptacle** concave, expanded, forming cup beneath calyx, sometimes with conspicuous spreading rim; perianth and androecium perigynous. **Sepals** 2, connate into a narrow conical, acuminate, circumscissile cap or calyptra, deciduous as a unit. **Petals** 4, obovate to obcuneate, golden-yellow, orange or white. **Stamens** 12–many, often adhering to base of petals. **Ovary** of 2 carpels, 1-locular, linear, glabrous; style 0; stigmas sessile, 4–8, spreading, linear. **Fruit** a capsule, cylindrical, with 10 conspicuous longitudinal ribs, 2-valved, dehiscing from base along placentas, often explosively. **Seeds** many, spherical to ellipsoid to obovoid;

testa grey-brown, or black, reticulate, ridged and burlike, or pitted. $x = 6$ (aneuploids, polyploidy).

Species ± 12; in SW North America and North Mexico; some species cultivated as ornamentals and naturalised elsewhere; 1 naturalised species in sthn Afr.: **Eschscholzia californica* Cham. (California Poppy), recorded as a troublesome weed in the Western Cape.

*Glaucium Mill. 2848000

Miller: [547] (1754); Bentham: 53 (1862); Fedde: 92 (1936); Zohary: 230 (1966); Meikle: 80 (1977); Mory: 499 (1979); Kadereit: 503 (1993); Kiger: 302 (1997).

Annual to biennial branched herbs, with taproots; stems and leaves usually glaucous, ± glandular-pilose; sap yellow. **Leaves** large, basal ones rosulate, petiolate; cauline ones alternate, sessile, often amplexicaul, ± lobed or toothed, pinnately incised or divided. **Inflorescences** axillary or terminal, 1-flowered, bracteate. **Flowers** hypogynous, long-pedicelled. **Sepals** 2, distinct, caducous. **Petals** 4, convolute in bud, yellow, orange or red, caducous. **Stamens** (7)10–30, free. **Ovary** of 2 connate carpels separated by a false septum into 2 cells, elongated, glabrous or with hairs or bristles, placenta rib-shaped; style 0 or indistinct; stigma distinctly 2-lobed. **Fruit** a capsule, opening by 2 basipetal or acropetal valves to varying degree, straight, curved or coiled; locule filled with pithy placental proliferation. **Seeds** many, dark brown, subglobose or reniform, reticulate-pitted. $x = 6$.

Species ± 23; from Atlantic Europe, Canary Islands to central Asia; 1 species recorded as a garden escape in sthn Afr.: **Glaucium corniculatum* (L.) Rudolph, Northern and Western Cape.

Papaver L. 2853000

Linnaeus: 506 (1753); Linnaeus: 224 (1754); Harvey: 15 (1860); Fedde: 288 (1909); Fedde: 108 (1936); Markgraf: 29 (1958); Mowat & Walters: 247 (1964); Merxmüller: 1 (1968); Kadereit: 335 (1988); Kadereit: 505 (1993); Lidén: 4 (1995); Kiger & Murray: 323 (1997).

Annual, biennial or perennial herbs, from taproots, glaucous, green parts glabrous or hairy to bristly, sometimes spiny (*Papaver aculeatum*); sap milky or coloured. **Leaves** mostly radical or rosulate, entire, dentate or crenate, pinnately incised or divided, sometimes somewhat spiny, petiolate. **Inflorescences** with flowers solitary or cymose on elongated peduncles; bracteate; buds nodding or erect. **Flowers** hypogynous. **Sepals** 2 or 3, distinct, mostly caducous, sometimes persistent. **Petals** 4(–6), usually broadly obovate, pink, orange or red, red petals sometimes with black marks. **Ovary** of 4–24 connate carpels with parietal placentas, 1-locular or sometimes incompletely multilocular, clavate to globose, glabrous or bristly; ovules many; style 0; stigmas 3–18(–22), sessile, linear, arranged in conical to flat disc over placentas, velvety. **Fruit** a capsule, subglobose or oblong in outline, opening by 3–18 basipetal pores or short valves below stigmatic disc, or disc caducous. **Seeds** many, small, often reniform, with sculptured testa. $x = 7$ (6, 11) (aneuploids, high polyploidy, B-chromosomes).

Species ± 80, widespread in northern hemisphere of Old World, Europe, temperate Asia, also Australia and Africa, 1 indigenous in Cape Verde Islands and 1 in sthn Afr.: *Papaver aculeatum* Thunb., Namibia, Northern Province, North-West, Gauteng, Mpumalanga, Free State, KwaZulu-Natal, Lesotho and Eastern Cape; 3 others introduced as weeds of cultivation.

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Passifloraceae

(Dilleniidae—Violales)

Compiled by R.H. Archer

Annual or perennial herbs, shrubs, small trees, or climbers, sometimes with large, tuber-like stems, often furnished with axillary tendrils; sometimes dioecious, rarely monoecious. **Leaves** alternate, petiolate, simple or compound, entire or dentate, often with extrafloral nectaries at base of petiole; stipules small, sometimes caducous or 0. **Flowers** bisexual or unisexual, regular, solitary or in few-flowered cymose to pseudoracemose, axillary inflorescences; single-

flowered peduncles jointed and often with 3 bracts. **Sepals** (3)4 or 5(6), free or partially connate, imbricate, often persistent; hypanthium saucer-shaped or tubiform. **Petals** (1–)3–5(6), free, rarely 0, arising in calyx tube or in sinuses. **Corona** simple, or in 1 or more rows of radiating threads or scales, or cup-shaped, or 0. **Disc** mostly extra-staminal, annular or composed of 5 strap-shaped glands, or 0. **Stamens** (4)5 or 6(–8), hypogynous or perigynous; filaments free, or united at base, or united into bundles, arising on hypanthium or on an androgynophore; anthers 2-thecous, basifixed to dorsifixed, opening lengthwise. **Ovary** superior, sometimes stalked, 1-locular, 3–5(6)-carpellate, with several to many anatropous, bitegmic ovules on 3–5(6) parietal placentas; styles as many as placentas, connate below or almost 0; stigmas often fleshy and capitate, sometimes much divided (*Adenia*). **Fruit** a loculicidally 3–5-valved capsule or a berry. **Seeds** usually compressed, enveloped in a fleshy or membranous aril; funicles often distinct; testa pitted or smooth; endosperm horny, embryo large, straight, with foliaceous cotyledons.

Genera 18, species 500, fairly cosmopolitan in warm climates; sthn Afr.: genera 5, species ± 20. Close to Flacourtiaceae and linked to it by *Adenia*.

Harvey: 498 (1862); Schreiber: 1 (1968); De Wilde: 104 (1976).

Key to genera

1a Subshrubs or small trees, without tendrils; corona segments tomentose ..... **Paropsia**
1b Mostly tendril climbers, rarely shrubs without tendrils, sometimes provided with thorns:
2a Flowers mostly unisexual; corona ill-developed or 0, the rootstock or stem swollen or tuberous ..... **Adenia**
2b Flowers bisexual; corona well developed:
3a Styles single; stigma 3- or 4-lobed ..... **Schlechterina**
3b Styles 3 or 4(5), free or partly connate:
4a Flowers small, up to 150 mm diameter; androgynophore 0, stamens arising from within upper half of inner corona ..... **Basananthe**
4b Flowers usually much larger; androgynophore distinct ..... ***Passiflora**

Adenia Forssk. 5370000

Forsskål: 77 (1775); Liebenberg: 513 (1939); De Wilde: 1 (1971); De Wilde: 106 (1976).

Modecca Lam.: 208 (1979); Harvey: 499 (1862).

Perennials, usually with tuber-like stem base giving rise to erect or climbing branches, sometimes spinose; dioecious, rarely monoecious. **Leaves** simple or digitately compound, with 1 or 2 glands at apex of petiole, sometimes with glands on underside of leaf; stipules acicular. **Flowers** unisexual, solitary or clustered or in cymes; sometimes peduncle ending in a tendril; corona a ring of hair-like processes, sometimes partly membranous, or a laciniate rim or 0. **Male flowers**: receptacle/hypanthium usually narrowly cylindric or cup- to saucer-shaped; sepals (4)5(6); lobes usually longer than tube; petals (4)5(6), arising in calyx tube or in sinuses, usually shorter than calyx lobes; glands 5 or 0; stamens free or connate, arising from calyx tube or centre of receptacle, usually shorter than petals; rudimentary ovary usually present. **Female flowers**: receptacle funnel-shaped; calyx lobed or segmented; petals 5 arising in calyx tube; glands present or 0; staminodes present, connate at base; ovary sessile or stipitate, usually ovoid, with several ovules on 3(–5) parietal placentas; style short or 0, 3(4)-branched; stigmas usually fleshy, papillate. **Fruit** a stipitate, 3(–5)-valved capsule; pericarp coriaceous to rather fleshy and hence fruit berry-like, reddish, yellowish, or brownish, sometimes as large as a hen's egg. **Seeds** usually compressed, with crustaceous, pitted testa. $x = 6$ (high polyploidy).

Species 93, fairly cosmopolitan in tropical countries; 10 in sthn Afr., widespread, except in Western Cape.

Basananthe Peyr. 5369000

Peyritsch: 101 (1859); De Wilde: 327 (1973); De Wilde: 120 (1976).

Tryphostemma Harv.: 32, t. 51 (1859); Harvey: 499 (1862); Schreiber: 1 (1968).

Herbs, annual or perennial, or small climbers, rarely shrubs, with or without tendrils. **Leaves** petioled or subsessile, entire, not lobed, bilobed, or digitately 3–5-lobed; stipules small or sometimes false stipules from supra-axillary bud. **Flowers** bisexual or sometimes functionally unisexual, 1–3 together, cymose, sessile or peduncled; bracts and bracteoles small, often forming an involucre. **Sepals** 5(6). **Petals** 0 or 1 or 2(4) or 5(6), usually shorter than sepals, oblong to lanceolate. **Corona** double, outer fimbriate above, inner cup-like, membranous. **Stamens** 5(6–9) arising from within upper half of corona; anthers basifixed, sometimes sagittate. **Ovary** sessile, with 3–few ovules on 3(4) parietal placentas; styles 3(4), free or partially united; stigmas globose. **Fruit** a 3(4)-valved capsule. **Seeds** 1–few, somewhat compressed, ellipsoid or reniform, arillate.

Species 25, Africa; 5 in sthn Afr., Namibia, Northern Province, Mpumalanga and KwaZulu-Natal.

Paropsia Noronha ex Thouars 5369010

Petit-Thouars: 59, t. 19 (1805); Masters: 505 (1871); Sleumer: 49 (1970); De Wilde: 105 (1976).

Subshrubs or small trees, mostly rusty-pubescent, without tendrils. **Leaves** ± distichous, coriaceous, ± oblong, not lobed; stipules 0. **Flowers** bisexual, in axillary fascicles, or solitary; hypanthium shallowly cup-shaped. **Sepals** (4)5, oblong, persistent. **Petals** (4)5, oblong or linear-spatulate, 1-ribbed. **Corona** single, laciniate; segments linear, tomentose, sometimes arranged in 5 bundles connate at base, opposite petals. **Stamens** 5, monadelphous, arising at base of gynophore; anthers cordate. **Ovary** ovoid, sometimes shortly stalked; styles (2)3(–5); stigmas capitate, subreniform; ovules numerous, attached to 3–5 parietal placentas. **Fruit** a 3(–5)-valved, subglobose, membranous, downy capsule. **Seeds** ovoid, compressed, with cup-shaped, membranous arillus; testa crustaceous, pitted.

Species 11, Africa, Madagascar to Malaya; 2 in sthn Afr., N Namibia, Botswana and Kruger National Park in Northern Province.

***Passiflora** L. 5372000

Linnaeus: 1355 (1753); De Wilde: 124 (1976).

Perennial climbers to lianas, provided with tendrils. **Leaves** lobed or simple, petiolate, margin mostly dentate; petiole and blade with or without glands; stipules minute to large. **Inflorescences** sessile or peduncled, 1–many-flowered with or without a simple tendril; bracts

and bracteoles small to large, forming a conspicuous involucre or not. **Flowers** 5-merous; hypanthium saucer-shaped to cylindrical. **Sepals** and **petals** free, often brightly coloured; petals mostly resembling sepals, sometimes 0. **Corona** extra-staminal, variously shaped, composed of a usually complicated outer corona consisting of threads, and flat or plicate inner coronas, and a nectary ring or annulus. **Androgynophore** mostly distinct. **Stamens** 5(–8), free, in older flowers mostly reflexed. **Gynophore** 0, or sometimes up to 7 mm long. **Ovary** globose to fusiform; styles 3(4), free or connate at base; stigmas capitate. **Fruit** mostly indehiscent, baccate, often with coriaceous exocarp, globose or ellipsoid, or rarely fusiform, many-seeded. $x = 6$ (10, 11) (polyploidy).

Species ± 370, mostly Americas and ± 20 in SE China and Australasia; several species have been introduced as ornamentals or for the edible fruits, e.g. **Passiflora edulis* Sims (Granadilla).

Schlechterina Harms 5363010

Harms: 148 (1903); De Wilde: 118 (1976).

Slender shrubs, becoming climbers, with tendrils in axils of upper leaves, glabrous. **Leaves** petiolate, dimorphic, either simple, ovate-elliptic and entire, or linear-elongate with irregularly undulate-crenate margin; petiole short, with two glands near apex. **Flowers** bisexual, in short, axillary, racemose clusters towards ends of branches; bracts lanceolate; buds subglobose; hypanthium short and broad. **Sepals** 3 or 4, broadly imbricate, with narrow, membranous margin. **Petals** 3 or 4, similar to sepals, but slightly smaller. **Corona** single, of many terete, tapering filaments ± as long as stamens, ± connate at base into a tube with short frills at their base within and inside tube. **Stamens** 6–8, with filaments shortly connate at base and with short, alternate lobes or 'glands' from within united base; anthers large, ± sagittate at base, dorsifixed, obtuse or mucronulate at apex with introrse dehiscence. **Ovary** shortly stipitate, narrowly ovoid or oblong, with numerous ovules on 4 parietal placentas; stigmas 4, thickened and grooved. **Fruit** a 3- or 4-valved capsule, shortly stalked, glabrous. **Seeds** compressed with smooth, shiny testa.

Species 1: *Schlechterina mitostemmatoides* Harms, tropical east Africa into NE KwaZulu-Natal.

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Pedaliaceae

(Asteridae—Scrophulariales)

Compiled by S.J. Smithies

Annual or perennial herbs, erect or procumbent, sometimes with a short swollen stem and tuberous roots, sometimes malodorous, rarely small trees with swollen stems, or shrubs with or without swollen main branches, sometimes spiny; usually with short-stalked and/or glandular hairs with head of 4 or more mucilage-filled cells. **Leaves** ± opposite or upper sometimes alternate to apparently fascicled, petiolate to subsessile, sometimes with nectaries at base of petiole, simple, entire to pinnatilobed, sometimes palmate, sometimes subsucculent; stipules 0. **Flowers** bisexual, irregular, weakly 2-lipped, usually axillary and solitary, rarely in raceme-like, terminal inflorescences; pedicels usually with 2 extrafloral nectaries (abortive flowers) at base. **Calyx** 5-partite; lobes separate almost to base or rarely free or ± connate and spathe-like. **Corolla** gamopetalous; lobes 5, sub- or unequal; limb often oblique; tube usually obliquely campanulate, sometimes funnel-shaped or cylindrical, posteriorly often gibbous, saccate, or rarely spurred at base. **Stamens** 4, ± didynamous, (often also 1 staminode, posterior), mostly arising near base of corolla tube, alternating with corolla lobes, rarely exserted; anthers bithecate, thecae hanging from apex of connective and often somewhat divergent, rarely spreading, or dorsally attached to connective and parallel, opening lengthwise; connective usually gland-tipped. **Nectary/disc** hypogynous, annular or unilateral, fleshy. **Ovary** superior, sessile, (1)2-locular; often falsely 4-locular: locules often partly or fully divided by false septa from carpellary midribs; ovules 1–many per compartment; placentas axile or rarely parietal and intruded; style filiform, exceeding anthers; stigma usually bilobed. **Fruit** variable, dehiscent or indehiscent, often with spines, horns or wings. **Seeds** 1–many per compartment; testa often characteristically sculptured, sometimes forming wings; embryo straight; endosperm 0 or sparse and oily.

Genera ± 17, species ± 85 (including Martyniaceae), mainly tropical and subtropical in Old and New World; sthn Afr: 10 (2 exotic) genera, 32 or 33 species, mainly in more arid areas; **Ibicella* and **Proboscidea* (sometimes placed under Martyniaceae), garden escapes or agricultural weeds from warm Americas; **Sesamum orientale* L. (= *S. indicum* L.), originally an Indian species, cultivated for its oil seeds.

Stapf: 253 (1897); Stapf: 454 (1904); Stapf: 538 (1906); Bruce: 417 (1953a); Bruce: 1 (1953b); Lawrence: 126 (1957); Straka & Ihlenfeldt: 175 (1965); Ihlenfeldt:43 (1967a); Ihlenfeldt: 593 (1967b); Merxmüller & Schreiber: 1 (1968); Ihlenfeldt: 86 (1988); Brummitt: 632 (1992); Hargreaves: 141 (1993); Ihlenfeldt: 1063 (1994b); Mabberley: 1 (1997).

Key to genera

1a Inflorescence terminal; placentation parietal (Martynioidcae):
2a Sepals united into a spathe-like calyx; flowers in a loose, open inflorescence ..... *Proboscidea
2b Sepals separate; flowers congested into a dense raceme ..... *Ibicella
1b Flowers axillary; placentation axile (Pedalioideae):
3a Fruit with 4 longitudinal wings; ovary 2-locular, with 1 or 2 ovules in each locule, if more than 2 ovules then corolla tube produced into a large sac below:
4a Corolla tube somewhat gibbous at base, but not conspicuously saccate ..... Pterodiscus
4b Corolla tube with large basal sac ..... Holubia
3b Fruit not as above; ovary 2-locular or falsely 4-locular, with few to many ovules; corolla tube sometimes gibbous at base or produced into a spur:
5a Fruit armed along margin with horny arms bearing recurved spines, or with spiny margins and a few protuberances on face ..... Harpagophytum
5b Fruit not as above:
6a Trees or shrubs, with spiny branches ..... Sesamothamnus
6b Herbaceous plants; branches without spines:
7a Fruit vertically compressed, convex on lower surface and with 2 conical spines on upper surface ..... Dicerocaryum
7b Fruit not vertically compressed, beaked, or horned at apex:
8a Fruit with locules unequal, horns, if present, below middle ..... Rogeria
8b Fruit with locules equal, horns, if present, apical:
9a Fruit beaked; corolla tube not distinctly gibbous at base ..... Sesamum
9b Fruit 2-horned at apex; corolla tube gibbous at base ..... Ceratotheca

Ceratotheca Endl. 7778000

Endlicher: 5, t. 1, 2 (1832); Stapf: 462 (1904); Phillips: t. 87 (1923); Ihlenfeldt: 43, t. 4 (1967a); Ihlenfeldt: 593 (1967b); Merxmüller & Schreiber: 2 (1968); Abels: 5 (1975); Ihlenfeldt: 94 (1988); Ihlenfeldt: 1063 (1994b).

Sporledera Bernh.: 41 (1842) not of Hampe; Bentham: 1059 (1876).

Annual or short-lived perennial herbs, rarely small shrubs; stems erect or sometimes procumbent, branched, sometimes woody; stems and leaves ± densely covered with mucilage glands and hairs. **Leaves** opposite, petiolate; lamina very variable, circular, ovate, cordate, reniform or lanceolate, hastate or 3-lobed, often polymorphic; margins ± entire, crenate or serrate; upper and lower leaves often much smaller and simpler. **Flowers** solitary, axillary, on short pedicels, pendent; white, pink or lilac, throat usually less intensely coloured. **Calyx** much shorter than corolla tube, suboblique, glandular-pilose. **Corolla** glandular-pilose; tube curved and slightly gibbous on adaxial side at base, funnel-shaped; limb sub-bilabiate, oblique, most lobes short and subequal, ovate, anterior lobe larger, often yellow, with dark stripes or lines of dark spots running down into the throat. **Stamens** subdidynamous, included; filaments linear; anthers oblong-linear, thecae parallel; staminodes 0. **Nectary** annular. **Ovary** equally 2-locular, falsely 4-locular because of a false septum almost to apex; oblong, with 2 divergent horns at apex, glandular-villous; ovules many in 1 series per compartment; style subterete; stigma of 2 lanceolate lobes. **Fruit** a capsule compressed at right angles to septum, obtuse or truncate at apex with 2 lateral horns. **Seeds** many, compressed, obovate, with shallow groove round edges and testa usually black when ripe. $x = 8$ (1 report, polyploidy).

Species 5, Africa; 4 in sthn Afr., widespread, except for Lesotho: 1 mainly in eastern half, Griqualand West (E Northern Cape) and Eastern Cape, 3 in small northern areas of Namibia, Botswana and Northern Province.

Dicerocaryum Bojer 7780000

Bojer: 268, t. 10 (1835); Bruce: 421 (1953a); Henderson & Anderson: 296 (1966) (*D. senecioides* (Klotzsch) Abels); Ihlenfeldt: 43, t. 5 (1967a); Ihlenfeldt: 598 (1967b); Merxmüller & Schreiber: 3 (1968); Abels: 5 (1975); Ihlenfeldt: 106 (1988); Ihlenfeldt: 1063 (1994b).

Pretrea J.Gay ex Meisn. 1: 298 & 2: 206 (1840); Stapf: 463 (1904); Merrill: 355 (1935).

Perennial herbs with persistent woody main root and 5–7 prostrate annual stems with many lateral branchlets; plant subglabrous to villous, covered with mucilage glands. **Leaves** opposite, subsessile to long-petiolate, very variable in shape, indentation and pubescence; lamina narrowly to broadly ovate, crenate to serrate or pinnatipartite to pinnatilobed, inferior surface densely mealy-glandular. **Flowers** solitary, axillary, pendent, with long, erect pedicels; white to pink or mauve, sometimes violet or yellow. **Calyx** much shorter than corolla tube, somewhat oblique, pubescent; segments linear-lanceolate to ovate-lanceolate. **Corolla** pilose; tube constricted near base and somewhat saccate on posterior side, then obliquely campanulate, curved; limb sub-bilabiate, upper and lateral lobes subequal, obovate, anterior one larger, with dark stripes or lines of dots running into the tube. **Stamens** subdidynamous, shorter pair included, longer ones just exserted; filaments linear; anthers with thecae parallel; staminodes 0. **Nectary** annular. **Ovary** 2-locular, false septum 0, usually with 2 or 5 ovules per locule; style somewhat compressed, linear, included; stigma of 2 ovate lobes. **Fruit** indehiscent, woody, longitudinally compressed to discoid, central part slightly to strongly raised, with 2 erect, conical spines on upper face and a hard, narrow wing. **Seeds** obovate to oblanceolate, compressed, with a groove on edges; testa somewhat crustaceous, almost smooth, usually dark-coloured.

Species 3, tropical and subtropical Africa; 2 in sthn Afr., N Namibia, Botswana and South Africa, roughly north of 26°S but extending a little further south, west of Kuruman (Northern Cape); also Swaziland.

Harpagophytum DC. ex Meisn. 7771000

Meisner 1: 298 & 2: 206 (1840); Stapf: 457 (1904); Henderson & Anderson: 298 (1966); Ihlenfeldt: 43, t. 8 (1967a); Ihlenfeldt: 600 (1967b); Merxmüller & Schreiber: 4 (1968); Ihlenfeldt & Hartmann: 15 (1970); Verdoorn: t. 1853 (1982); Ihlenfeldt: 109, 111 (1988); Hargreaves: 145 (1993); Ihlenfeldt: 1063 (1994b).

Uncaria Burch.: 536 (1822) name illegitimate, not of Schreb.

Perennial, trailing herbs with several annual stems from a succulent, often tuberous taproot, further tubers often present on lateral roots; whole plant ± glabrous but covered with mucilage glands. **Leaves** opposite, shortly petiolate, variable in shape and often polymorphic, subsucculent, usually pale beneath because of white glands.

Flowers solitary, axillary, shortly pedicellate, erect; white or yellow and pink, mauve or purplish red, usually with light tube and darker limb. **Calyx** much shorter than corolla tube; segments sometimes unequal, glandular-hairy. **Corolla**: tube ± cylindrical or narrowly funnel-shaped, basally constricted; limb spreading; lobes subequal, circular to oblate. **Stamens** didynamous or ± equal, included; anthers with thecae divergent, apiculate; staminode 1, with apical gland. **Ovary** 2-locular with no false septa; ovoid or elliptical, sometimes nodulose; ovules many, in 2 or 4 rows in each locule; style terete, included; stigma of 2 ovate, membranous lobes. **Fruit** a woody, 2-locular capsule, laterally compressed at right angles to septum, with 2 obtuse protuberances on each face and armed along edges with 2 rows of curved, horny arms, each bearing recurved spines, or edges with 2 rigid wings bearing recurved spines; tardily and imperfectly loculicidal. **Seeds** many, narrowly obovate, unevenly angled, black; testa irregularly reticulate.

Species 2, sthn Afr., widespread mainly in warm, dryish areas of Namibia, Botswana and N South Africa but extending as far south as Pretoria (Gauteng), Barberton (Mpumalanga) and Bloemfontein (Free State); also Madagascar.

Holubia Oliv. 7772000

Oliver: t. 1475 (1884); Stapf: 457 (1904); Phillips: t. 661 (1937); Ihlenfeldt: 43. t. 7 (1967a); Ihlenfeldt: 89 (1988); Ihlenfeldt: 1063 (1994b).

Annual herb, sometimes biennial, erect with spreading branches; stems square, slightly fleshy and minutely glandular. **Leaves** opposite, long-petiolate, circular to ovate, slightly lobed or sinuate, basally truncate or slightly cordate, subsucculent, glabrous above, sparingly glandular below. **Flowers** solitary, axillary; yellow-green to white. **Calyx** much shorter than corolla tube; segments lanceolate, glandular. **Corolla**: tube with large, posterior, flattened sac at base, centrally cylindrical and funnel-shaped at mouth; limb spreading, obscurely 2-lipped; lobes transversely oblong. **Stamens** didynamous, arising about middle of corolla tube, included; filaments long, terete, glandular-villous at base; anthers with thecae divergent, connective apiculate; staminode 1. **Nectary** thick, cushion-like, slightly asymmetrical. **Ovary** 2-locular, 4-angled, glandular; locules undivided with ± 8 ovules in each, in 2 rows, ascending; style terete, scarcely exserted; stigma of 2 ovate, somewhat crenate lobes. **Fruit** indehiscent, rotund to circular in lateral view, ± rectangular in cross section, each edge with a broad parchment-like wing with conspicuous, usually dark, reticulate veins; mesocarp not spongy. **Seeds** flattened, obovate, with a narrow, ribbed, marginal wing; testa finely honeycombed.

Monotypic: *Holubia saccata* Oliv., E Botswana, Northern Province to E North-West and N Mpumalanga; also Zimbabwe.

*__Ibicella__ Van Eselt. 7785010

Van Eseltine: 31 (1929); Stapf: 263 (1897) as *Proboscidea*; Bailey: 909 (1949); Lawrence: 126 (1957); Henderson & Anderson: 300 (1966); Ihlenfeldt: 43, t. 11 (1967a); Bailey & Bailey: 588 (1977); Wells *et al.*: 298 (1986).

Robust, ± prostrate, much-branched annual herbs, with dense glandular pubescence on most parts; stems terete, striate. **Leaves** large, ± opposite, long-petiolate, broadly ovate to ± orbicular, strongly cordate at base, sometimes the 2 sides overlapping, obscurely lobed, margins remotely dentate, both surfaces glandular-pubescent; veins usually 5, digitate at base, otherwise pinnate. **Flowers** pendent in dense terminal racemes on peduncles, elongating in fruit; yellow, sometimes with red, dotted honey guides on lower corolla lobes; extrafloral nectaries 0; bracts elliptic, with fringe of glandular hairs, fewer elsewhere. **Calyx** shorter than corolla, oblique, of 5 free lobes, varying linear-lanceolate to obovate, lowermost 2 broadest, apices obtuse to acute or acuminate, fringed like bracts. **Corolla** obliquely campanulate; tube narrowing just above base but widening rapidly above, sometimes somewhat curved; limb sub-bilabiate, flaring; lobes broadly obovate, unequal, lowermost broadest. **Stamens** didynamous, included; anthers with thecae spreading; staminode 1. **Nectary** regular. **Ovary** ovate, tapering into long, terete, persistent style, 2-carpellate but 1-locular with (in cross section) short-stemmed, T-shaped intrusions of 2 parietal placentas dividing area into 5 chambers, 4 peripheral and 1 central; ovules many, borne on peripheral edges of septa, descending; stigma broader than style, 2-lobed. **Fruit** a large, woody, cylindrical-ovoid capsule, tapering into a slender, curved beak longer than capsule; surface covered with rough protuberances or with ascending, conical spines from woody endocarp and piercing outer, somewhat fleshy pericarp; splitting longitudinally into 2 valves down centre of beak and parallel to septa. **Seeds** obovate, tuberculate; testa finely transversely ridged. $x = 8$ (1 report, polyploidy).

Species 3, warm and tropical South America; 1 in sthn Afr.: **Ibicella lutea* (Lindl.) Van Eselt., introduced from Brazil; garden escape or weed of cultivation.

*__Proboscidea__ Schmidel 7785000

Schmidel: 49 (1763); Stapf: 265 (1897); Bailey: 909 (1949); Lawrence: 126, t. 40 (1957); Ihlenfeldt: 43, t. 11 (1967a); Bailey & Bailey: 912 (1977); Wells *et al.*: 654 (1986) as *Martynia*.

Broad-topped, sticky-pubescent, annual herbs with stout, branched stems. **Leaves** large, opposite, long-petiolate, broadly ovate, mature ones 5-lobed, base cordate, margin irregularly and shallowly toothed, glandular-pubescent, veins digitate at base, otherwise pinnate. **Flowers** large, in few-flowered, loose, axillary racemes, lilac to purple. **Calyx** spathe-like, with 5 ± connate, unequal lobes. **Corolla** campanulate, obscurely 2-lipped, limb short, flaring. **Stamens** didynamous, included; staminodes 0. **Nectary** regular. **Ovary** ovate, tapering into persistent style, 2-carpellate but 1-locular, divided by 2 ± T-shaped intrusions or septa into 5 chambers, 4 peripheral and 1 central; placentation parietal with several ovules borne on peripheral edges of septa; stigma broader than style, 2-lobed. **Fruit** a cylindric-ovoid, 2-valved capsule, tapering into a long, curved beak which splits, forming 2 large, opposed, hook-like appendages when dry, viscid-tomentose, with deciduous, fleshy pericarp and woody endocarp crested longitudinally on posterior side. **Seeds** obovate, crinkled, without wings. $x = 15$.

Species 9, warm Americas; 1 introduced in sthn Afr.: **Proboscidea fragrans* (Lindl.) Decne., from Mexico, ornamental and cultivated for fruit, sporadic as garden escape, and perhaps naturalised.

Pterodiscus Hook. 7769000

Hooker: t. 4117 (1844); Stapf: 455 (1904); Stapf: 541 (1906); Phillips: t. 213 (1926); Phillips: t. 734 (1939); Ihlenfeldt: 43, t. 8 (1967a); Ihlenfeldt: 602 (1967b); Merxmüller & Schreiber: 5 (1968); Ihlenfeldt: 89, 91 (1988); Hargreaves: 149 (1993); Ihlenfeldt: 1063 (1994b).

Pedaliophyton Engl.: 111, t. 5 (1902); Bruce: 419 (1953a).

Perennial herbs, with a persistent basal organ consisting either of a short, swollen aerial stem arising from a subterranean tuber of ± the same diameter, or a woody, not distinctly swollen stem (rarely stems) arising from a napiform or pyriform subterranean tuber; several annual shoots, usually unbranched, arise from top of basal organ. **Leaves** opposite or alternate, linear to broadly ob-

long, entire, undulate, dentate, pinnatifid or pinnatipartite, subsucculent, sometimes glandular beneath. **Flowers** solitary, axillary, shortly pedicellate; yellow, orange, red or purple, sometimes mixed on one flower. **Calyx** small, persistent, much shorter than corolla tube; segments sometimes unequal. **Corolla** ± 2-lipped; tube funnel-shaped, or narrowly cylindrical and constricted in lower part, often oblique or slightly gibbous at base (reduced spur); limb spreading, lobes subequal or clearly unequal, circular to oblate. **Stamens** didynamous, included; filaments linear, glandular-villous at base; anthers with thecae divergent, apiculate; staminodes 0(1). **Nectary** somewhat inconspicuous. **Ovary** 2-locular; locules undivided; ovules 1–3 or 5 or 6 per locule, pendulous; style linear, included; stigma of 2 ovate lobes, with fimbriate margins. **Fruit** indehiscent, laterally compressed, with a longitudinal parchment-like wing on each of 4 edges, unarmed, ± circular or ovate in lateral view, often asymmetrical, apex emarginate or apiculate, base usually emarginate; upper part of fruit sterile and forming a distinct beak; mesocarp spongy with large cavities; endocarp thin, sclerified and very tough. **Seeds** 1 or 2 in each locule, variable in shape and testa structure.

Species ± 18, Africa; 4 in sthn Afr., widespread mainly in northern, warm, dryish parts in Namibia, Botswana and South Africa, from Messina (Northern Province) southwards to Skukuza (Mpumalanga), Swaziland, Free State and Prieska (Northern Cape), and one species in Eastern Cape.

Rogeria J.Gay ex Delile 7776000

Delile: 78, t. 2 (1826); Stapf: 459 (1904); Stapf: 548 (1906); Andrews: 160 (1956); De Winter: 106 (1961); Ihlenfeldt: 43, t. 9 (1967a); Ihlenfeldt: 605 (1967b); Merxmüller & Schreiber: 6 (1968); Ihlenfeldt: 1063 (1994b); Nel: 111 (1994).

Erect, robust or rarely soft, trailing, annual or rarely perennial herbs, simple or sparsely branched, usually somewhat fleshy and ± covered with mucilage glands. **Leaves** opposite, long-petiolate; lamina broad, ovate to rhombic or cordate, sometimes ± 3-lobed, margins ± sinuate to coarsely dentate, veins digitate at base, elsewhere pinnate, mealy-glandular beneath. **Nectaries** extrafloral, present at base of petioles and pedicels. **Flowers** single or few in axillary cymes on short pedicels; usually violet, pink, cream or white, often with darker throat. **Calyx** small, much shorter than corolla tube, persistent, becoming hard and spiny in fruit; tube shallowly saucer-shaped; lobes ovate or lanceolate, often unequal. **Corolla**: tube slightly gibbous to saccate on posterior side of base, then cylindric, becoming campanulate above, usually somewhat curved; limb sub-bilabiate, spreading, lobes suborbicular to obovate. **Stamens** didynamous, usually arising low down in corolla tube, sometimes further up, included or slightly exserted; filaments filiform to broadly linear, long, pilose at base; anthers with thecae dorsifixed, parallel but at length divergent; staminodes 0 or 1. **Nectary** shallow, adnate to base of ovary. **Ovary** ovoid or elongate-conical, sometimes glabrous below, densely glandular above, unequally 2-locular, falsely 4-locular; anticous locules with many ovules in 3–5 rows, posterior locules with few ovules, in 1 row; style terete, slightly exserted; stigma of 2 unequal, lanceolate lobes. **Fruit** a chartaceous to woody, obliquely ovoid or lanceolate, beaked capsule, often curved at apex, slightly gibbous at base or armed with 2–8 tubercles or conical, spreading or recurved spines below middle; loculicidal almost to base or anterior locule tardily loculicidal to middle or lower, and posterior locule indehiscent. **Seeds** ± obovate to oblong, not winged, dark; testa of each face finely punctate or with large pits in reticulate pattern; narrow, marginal wing more finely reticulate; sometimes oily. $x = 8$ (1 report, polyploidy).

Species 6, Africa and 1 in Brazil; 4 in sthn Afr., Namibia and Northern Cape (Namaqualand and Griqualand West).

Sesamothamnus Welw. 7774000

Welwitsch: 49, t. 18 (1869); Stapf: 567 (1906); Bruce: 417 (1953a); Ihlenfeldt: 43, t. 7 (1967a); Ihlenfeldt: 593 (1967b); Merxmüller & Schreiber: 8 (1968); Codd: t. 1640 (1972); Ihlenfeldt: 87 (1988); Ihlenfeldt: 1063 (1994b).

Sigmatosiphon Engl.: 150 (1894); Bruce: 418 (1953a).

Small trees or shrubs; trunk smooth, or with peeling papery bark, usually swollen at base; branches many, stiff, grey, ascending, rapidly tapering, with spinous branchlets; usually with mucilage glands, hairs sometimes stellate on young stems and other parts. **Leaves** deciduous, obovate and entire, petiolate and alternate on long shoots, almost sessile and apparently fascicled on abbreviated branches in axils of spines (modified petioles). **Flowers** large, in terminal or subterminal, few-flowered, short, raceme-like inflorescences; white, cream, pink or yellow, tube often dark-coloured; sweet-scented. **Calyx** much shorter than corolla tube, oblique. **Corolla**: tube long, slightly curved, cylindrical, usually with a gibbosity to long spur near base; limb sub-bilabiate, spreading to reflexed; lobes subequal, elliptic or suborbicular, entire. **Stamens** subequal, arising near throat of corolla tube, included; filaments broadly linear, shorter than anthers; thecae parallel; staminodes 0. **Nectary** fused with base of ovary, oblique and posteriorly gibbous. **Ovary** 2-locular; locules divided nearly to apex by a false septum; ovules many, in 1 row in each compartment; style linear, exserted; stigma of 2 ovate, membranous lobes. **Fruit** a rigid, woody, obovate to oblong capsule, laterally compressed, loculicidal from apex to base. **Seeds** large, subcircular to transversely oblong, compressed, with a broad, membranous, marginal wing; testa subleathery.

Species ± 5, Africa; 2 or 3 in sthn Afr., N Namibia, Botswana, Messina (Northern Province) to Rustenburg (North-West), plus northern Kruger National Park (Northern Province) and Burgersfort area (N Mpumalanga); usually on calcareous soils.

Sesamum L. 7777000

Linnaeus: 634 (1753); Linnaeus: 282 (1754); Stapf: 459 (1904); Stapf: 550 (1906); Bruce: 425 (1953a); Bruce: 16, t. 7 (1953b); Merxmüller: 1 (1959); Ihlenfeldt: 43, t. 4 (1967a); Ihlenfeldt & Seidensticker: 5 (1968); Merxmüller & Schreiber: 9 (1968); Ihlenfeldt & Grabow-Seidensticker: 53 (1979); Grabow-Seidensticker: 217 (1988); Ihlenfeldt: 97 (1988); Ihlenfeldt: 395 (1994a); Ihlenfeldt: 1063 (1994b).

Annual or perennial, erect herbs, rarely dwarf shrubs or shrubs, usually sparsely branched. **Leaves** sessile or petiolate; lamina entire, lobed or digitate, often polymorphic. **Flowers** solitary, axillary, shortly pedicellate with extrafloral nectaries (reduced flowers) at base; usually pink. **Calyx** much shorter than corolla tube, usually suboblique, persistent or deciduous; segments linear or lanceolate-linear, usually acuminate. **Corolla**: tube shortly cylindrical at base, obliquely campanulate above; limb sub-bilabiate, ± oblique; lobes obovate with lowest lobe longest. **Stamens** subdidynamous, included; filaments terete, usually glandular-pilose at base; anthers oblong, dorsifixed; thecae parallel, connective gland-tipped; staminodes 0. **Nectary** annular, sometimes rudimentary. **Ovary** subcylindrical, equally 2-locular, falsely 4-locular with a false, parietal septum almost to apex; ovules many per compartment, in 1 row; placentation axile; style terete, included; stigma of 2 obovate or lanceolate-ovate, membranous lobes. **Fruit** a ± erect capsule, cultrate to narrowly oblong or obconical in lat-

eral view, shortly beaked, slightly compressed at right angles to septum, 4-sulcate, loculicidal towards base. **Seeds** obovate, sometimes 4-angled, compressed, with acute margins or winged at one or both ends, or with a double, rarely single, membranous fringe; testa subcoriaceous, smooth or rugose and muriculate-foveolate; sometimes oily. $x = 13$ (8, 9) (high polyploidy).

Species ± 15, mostly in tropical and subtropical Africa, also Mascarene Islands, S Europe to India and Sri Lanka; 11 in sthn Afr. (1 escaped from cultivation), mainly Namibia, also Botswana, Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal and NW Eastern Cape.

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Penaeaceae

(Rosidae—Myrtales)

Compiled by C.L. Bredenkamp

Shrubs or undershrubs, erect to decumbent, generally glabrous, of ericoid habit; young branches often with 4 distinct ridges ending on each side of the leaf base as a short tip. **Leaves** opposite, entire, decussate, often imbricate, mostly sessile, often coriaceous; stipules small, sometimes glandular or absent. **Inflorescence** mostly terminal, a panicle, thyrse or spike or of 1 terminal flower only; flowers subtended by 1, 2 or more pairs of leaf-like bracts and/or bracteoles. **Flowers** bisexual, regular, apetalous, 4-merous, with a perianth tube (hypanthium). **Perianth**: tube cylindric to somewhat campanulate; lobes 4, equal, valvate or reduplicate-valvate in bud. **Stamens** 4, arising in throat of perianth

tube, alternating with its lobes; filaments short; anthers 2-thecous, with thick connective. **Ovary** superior, 4-locular, with 2 or 4 basal, erect, or 2 erect and 2 pendulous ovules in each locule; style terete or with 4 wings or angles; stigma capitate and obscurely 4-lobed or of 4 cruciform lobes. **Fruit** a 4-valved loculicidal capsule, often with valves awned with persistent base of style. **Seeds** by abortion 1 or 2 in each locule; funicle and raphe separable from seed.

Genera 7, species 23, endemic to S and SW Western Cape and S Eastern Cape.

Stephens: 81 (1915); Salter: 591 (1950); Dahlgren: 3 (1967a); Dahlgren: 69 (1967c); Dahlgren & Van Wyk: 43 (1988).

Key to genera

1a Ovules 4 in each locule, 2 ascending, 2 pendulous:
2a Bracteoles 4 or 6 to each flower, often caducous; pollen grains mostly 3-colporate ..... **Endonema**
2b Bracteoles 2 to each flower; flowers in compact, terminal clusters; pollen grains mostly 5-colporate ..... **Glischrocolla**
1b Ovules 2 or 4 in each locule, all ascending:
3a Style with 4 prominent wings; pollen grains 4- or sometimes 5-colporate ..... **Penaea**
3b Style terete or with 4 or 8 angles or ridges:
4a Pollen sacs usually only half as long as the connective body; perianth in flowering stage usually pale yellow often turning reddish with age; pollen grains 4- or 5-colporate ..... **Stylapterus**
4b Pollen sacs more than half as long as the connective body; perianth in all stages rose, purple, or dark red; pollen grains mostly 3-colporate:
5a Bracts and bracteoles with entire, even margins without apical gland; bracts narrower than the vegetative leaves... ..... **Brachysiphon**
5b Bracts and bracteoles with margins partly denticulate to fimbriate, generally with apical gland; outer bracts broader than the vegetative leaves:
6a Free part of filaments very short; each locule 2-ovulate; vegetative leaves with apical gland..... **Sonderothamnus**
6b Free part of filaments as long as the connective, rather flat; each locule 4-ovulate; vegetative leaves often without apical gland ..... **Saltera**

Brachysiphon A.Juss. 5426000

Jussieu: 24. t. 2, fig. 3 (1846); Stephens: 90 (1915); Dahlgren: 27 (1968); Rourke: 63 (1995).

Shrublets, decumbent to erect; branchlets 4-ridged. **Leaves** coriaceous, entire, without dark, apical areola. **Flowers** lateral or terminal, solitary or in cymes or in few-flowered, thyrsoid racemes; bracts foliaceous; bracteoles usually narrow, often partly hyaline, with entire margin, without apical spot. **Perianth**: tube narrowly cylindric to campanulate, 5–12(–14) mm long, dark red or a shade of purple; lobes ovate, usually acute, with reduplicate-valvate aestivation. **Stamens**: filaments linear to conical, 0.5–1.5 mm long; connective triangular-ovate, carnose, rugose to almost bullate. **Ovary** smooth or papillate, with 2 ascending ovules in each locule; style terete or slightly angular; stigma small, capitate, ± distinctly quadrangular. $x = 10$ (1 report).

Species 5, SW Western Cape.

Endonema A.Juss. 5423000

Jussieu: 26, t. 3 (1846); Stephens: 96 (1915); Dahlgren: 69 (1967c).

Shrubs or undershrubs, with 4-ridged branchlets. **Leaves** decussate, sessile. **Flowers** solitary in axils of upper leaves; bracts in 2 or 3 pairs below each flower. **Perianth**: tube cylindric, slightly narrowed towards base and throat, yellow; lobes valvate, much shorter than tube, becoming reflexed with age. **Stamens** longer or shorter than perianth lobes; filaments flattened, ± as long as anthers; anthers versatile, slightly shorter than connective. **Ovary** angled, with 2 erect and 2 pendulous ovules in each locule; style terete, as long as or longer than perianth tube; stigma obscurely 4-lobed. **Fruit** a 4-valved capsule; seeds brownish.

Species 2, SW Western Cape.

Glischrocolla (Endl.) A.DC. 5424000

Candolle: 490 (1856); Stephens: 96 (1915); Dahlgren: 57 (1967b).

Shrubs or shrublets, erect or ascending, with dichotomous branching; young branches 4-ridged. **Leaves** imbricate, with pale, almost white margins, grooved above and with prominent midrib on lower surface. **Flowers** in terminal, congested racemes, bracteate; lower bracts foliaceous, upper narrow. **Perianth**: tube cylindric, narrowed slightly towards base and throat, yellow, changing to carmine; lobes reduplicate-valvate in bud, becoming reflexed with age. **Stamens** shorter than perianth lobes and filaments shorter than anthers; anthers cordate-ovate; thecae with membranous margin and longer than connective. **Ovary** 4-locular, with 2 erect and 2 pendulous ovules in each locule; style terete, as long as or longer than perianth tube; stigma capitate, obscurely 4-lobed. **Capsule** 13–15 mm long, excluding persistent style base.

Species 1: *Glischrocolla formosa* (Thunb.) R.Dahlgren (= *G. lessertiana* (A.Juss.) A.DC.), very rare in SW Western Cape.

Penaea L. 5425000

Linnaeus: 111 (1753); Stephens: 82 (1915) in part; Dahlgren: 5 (1971); Rourke & McDonald: 400 (1989).

Shrubs or undershrubs, with 4-ridged branchlets. **Leaves** dense, usually overlapping. **Flowers** lateral in axils of foliaceous bracts; bracteoles usually 2. **Perianth**: tube cylindric, sometimes somewhat contracted towards base and throat, dirty yellow sometimes turning bright purple; lobes valvate, much shorter than tube, erect. **Stamens** ± as long as perianth lobes; filaments shorter than anthers; anthers with thick, fleshy connective, with thecae obliquely placed near inner base. **Ovary** 4-locular, with 2–4 ascending ovules in each locule; style with 4 longitudinal, membranous wings, readily separable into 4 parts, arranged in cruciform manner at apex of wings. **Fruit** a 4-valved capsule, with persistent style base. **Seeds** sometimes 1 by abortion in each valve, oblong, brown, funicled.

Species 4, SW & S Western Cape, S Eastern Cape (to Port Elizabeth).

Saltera Bullock 5427000

Bullock: 109 (1959); Dahlgren: 51 (1968).

Penaea L. in part. *Sarcocolla* Kunth in part.

Shrublets or shrubs, erect or ascending, sparingly branched; branchlets 4-ridged. **Leaves** imbricate, entire,

coriaceous, with or without a dark areola. **Flowers** 1–7, terminal, sessile, usually bracteate and usually in small, capitate spikes; bracts: lowest larger than leaves, denticulate-fimbriate, with or without apical gland and with sticky secretion. **Perianth**: tube cylindric, rose or purple, seldom white; lobes ± a third as long as tube, becoming reflexed. **Stamens**: filaments erect, linear, ± as long as the elliptic-oblong connective; anthers ± oblong, slightly shorter than connective, with shortly papillate fissure margins. **Ovary** sessile, smooth, with 4 ascending ovules in each locule; style slender; stigma capitate, quadrangular, relatively large. $x = 10$ (1 report, polyploidy).

Species 1: *Saltera sarcocolla* (L.) Bullock, SW Western Cape.

Sonderothamnus R.Dahlgren 5426010

Dahlgren: 41 (1968).

Brachysiphon A.Juss.: 24, t. 2, fig. 3 (1846) in part; Stephens: 90 (1915) in part; Dahlgren: 41 (1968) in part. *Sarcocolla* Kunth: 667 (1830) in part. *Sondera* proposed name: Dahlgren: 5 (1967a).

Shrublets, erect or ascending, sparingly branched; branchlets thickened at nodes, 4-ridged. **Leaves** overlapping, obtuse, entire or upper sometimes denticulate to fimbriate, with a dark, lunulate or poriferous apical spot or wart. **Flowers** in small, lateral cymes and a single, terminal one; cymes and individual flowers (except terminal) 2-bracteate; bracts somewhat fimbriate and with hyaline margin and a dark, apical wart or areola; lower bracts larger than adjacent leaves. **Perianth**: tube narrowly cylindric, 7–12 mm long; lobes ovate or broadly lanceolate, acute, with reduplicate aestivation; purple or partly rose. **Stamens**: filaments 0.1–0.3 mm long; anthers ± as long as connective. **Ovary** smooth, with 2 ascending ovules in each locule; style terete or slightly angular; stigma relatively large, capitate and somewhat quadrangular.

Species 2, SW Western Cape.

Stylapterus A.Juss. 5425010

Jussieu: 15 (1846); Dahlgren: 3 (1967a).

Shrubs or shrublets, erect or occasionally procumbent to ascending; young branches often 4-angled. **Leaves** sessile or sometimes shortly petiolate, entire, opposite, linear to ovate or oblanceolate, often reduced in size towards tips of branches, glabrous. **Flowers** usually in spike-like racemes; bracts foliaceous; bracteoles variable. **Perianth** united, at least in basal half, into a campanulate or cylindric tube, with 4(5) triangular lobes, simply valvate, often with thickened apex and keeled inner face, persistent and enclosing capsule, accrescent, white to pale yellow or sometimes pink, often becoming purplish with age. **Stamens**: filaments fused for greater part to inner wall of perianth tube, with very short free portion, extending into an expanded cordate-ovate, fleshy connective, on inner basal portion of which are produced 2 thecae with introrse dehiscence. **Ovary** 4-locular, with 2 ascending ovules from near base of inner surface of each locule; style columnar, with 4–8 longitudinal ridges and 4 rather flat, stigmatic lobes at apex. **Capsule** hard, quadrangular-ovoidal with loculicidal dehiscence.

Species 8, SW Western Cape.

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Phytolaccaceae

(Caryophyllidae—Caryophyllales)

Compiled by M. Jordaan

Herbs, shrubs, or small (rarely large) trees, sometimes scrambling, very often glabrous and often somewhat succulent. **Leaves** alternate, simple, entire, with crystals generally visible in young stage, usually petiolate; stipules 0. **Inflorescences** terminal or axillary, most frequently racemose or cymose; bracts and paired bracteoles small. **Flowers** small, bisexual (unisexual in a few species of *Phytolacca*; plants then usually dioecious), mostly regular (± weakly irregular in *Hilleria*), hypogynous. **Perianth** simple. **Tepals** 4 or 5, free (slightly connate in *Hilleria*), imbricate, inconspicuous to petaloid, mostly greenish to whitish, less often yellow or reddish, usually persistent. **Stamens** (3)4–many, in 1–several whorls, when definite then alternating with tepals, usually produced from a ± fleshy disc; filaments free or connate at base; anthers dorsifixed, tetrasporangiate, mostly ± linear, incised at base, often also at tip, dehiscing introrsely lengthwise. **Ovary** superior or half-inferior, of 1–17 free or united carpels, arranged in 1 whorl; ovule 1 per carpel, campylotropous, bitegmic, crassinucellate, basal or nearly so in single carpels, or axile in syncarpous ovaries; styles 1 per carpel, short, free or connate at base or 0; stigmas free, linear or capitate. **Fruit** various, fleshy or dry. **Seed** subglobose, discoidal or reniform, with a membranous or brittle testa, occasionally arillate; perisperm copious to lacking in mature seed; embryo curved.

Genera 17, species ± 70; predominantly neotropical, some in Old World, a few in temperate regions; sthn Afr.: genera 4 (1 exotic), species 10.

Brown: 454 (1818); Moquin-Tandon: 2 (1849a); Hooker: 78 (1880); Heimerl: 1 (1889); Walter: (1909); Heimerl: 135 (1934); Nowicke: 294 (1968); Brown & Varadarajan: 49 (1985); Stannard: 161 (1988); Rohwer: 506 (1993).

Hutchinson (1959, 1973) segregated *Hilleria*, *Rivina* and *Lophiocarpus* from Phytolaccaceae and included them in the Petiveriaceae.

Classification of Phytolaccaceae (after Rohwer 1993)

I. Subfamily PHYTOLACCOIDEAE (Tepals 5; carpels 3–17, free or connate; fruit a berry): *Phytolacca*
II. Subfamily RIVINOIDEAE (Tepals 4; carpel 1; fruits various, indehiscent): *Hilleria*, **Rivina*
III. Subfamily MICROTEOIDEAE (Tepals mostly 5; carpels 2, completely connate; ovary 1-locular with 1 ovule; fruit an achene): *Lophiocarpus*

Key to genera

1a Ovary of 1 or 2 carpels:
  2a Ovary with 1 stigma:
    3a Perianth of 4 free, subequal tepals; fruit juicy ..... ***Rivina**
    3b Perianth with 3 anterior tepals united to ± the middle, posterior one free; fruit dry ..... **Hilleria**
  2a Ovary with (2)3–4 stigmas ..... **Lophiocarpus**
1b Ovary of 5–16 carpels; carpels free or united; fruit a lobed berry ..... **Phytolacca**

Hilleria Vell. 2373000

Vellozo: 47, t. 122 (1825); Walter: 80 (1909); Heimerl: 150 (1934); Hutchinson: 438 (1959) in Petiveriaceae; Nowicke: 339 (1968); Polhill: 4 (1971); Hutchinson: (1973); Rohwer: 513 (1993).

Mohlana Mart.: 170, t. 290 (1832).

Soft herbs, sometimes suffrutescent at base. **Inflorescences** terminal and axillary racemes. **Flowers** bisexual, irregular. **Tepals** 4, 1 sepal free, with the rounded median lobe the longer, accrescent, surrounding the fruit, becoming 3-nerved and sometimes brightly coloured, the lower 3 ± united to their middle. **Stamens** 4(–13). **Ovary** of 1 carpel, globose and ± laterally compressed; style very short or 0, up to as long as ovary, tapered or capitate; stigma feathery or capitate. **Fruit** a utricle, discoidal, with a slightly toughened skin closely adhering to seed, reticulately nerved when dry. **Seed** similarly shaped, with brittle, black testa. $x = 9$ (1 report, polyploidy).

Species 3–5, South America and tropical Africa, with 1: *Hilleria latifolia* (Lam.) H.Walter, widespread also in Africa, Madagascar and the Mascarene Islands; one record in forest undergrowth at Umhlanga Rocks, KwaZulu-Natal; the distribution records suggest that it is indigenous in Africa.

Lophiocarpus Turcz. 2287000

Turczaninow: 56 (1843); Heimerl: 163 (1934); Nowicke: 353 (1968); Eckardt: 13 (1974); Nowicke: 288 (1969); Schreiber: 1 (1969); Stannard: 169 (1988); Rohwer: 513 (1993).

Microtea Sw.: 53 (1788) in part; Hill: 455 (1912) in part. *Wallinia* Moq.: 143 (1849b).

Herbs, sometimes suffrutescent at base. **Leaves** linear. **Inflorescences** slender spikes, bracteate, in clusters of (2)3. **Flowers** bisexual, regular, small. **Tepals** 4 or 5, sometimes unequal. **Stamens** 4, included or slightly exserted; filaments free; anthers 2-thecous, elongate. **Ovary** subglobose; ovule solitary on short, basal funicle; styles 4, very short, usually connate below; stigmas 4. **Fruit** an achene, subglobose, enclosed in persistent perianth, muricate, warty, or ridged. **Seed** with membranous testa; endosperm present; embryo curved.

Species 4, confined to Africa; all in sthn Afr., mainly arid regions, Namibia, Botswana, Northern Province, Gauteng, Mpumalanga, Free State, N KwaZulu-Natal and Northern Cape.

Different authorities have placed this genus either in the family Chenopodiaceae (Cronquist 1981) or Phytolaccaceae (Nowicke 1968, 1969; Rohwer 1993).

Phytolacca L. 2380000

Linnaeus: 441 (1753); Linnaeus: 200 (1754); Moquin-Tandon: 31 (1849a); Sonder: 156 (1860); Hooker: 84 (1880); Heimerl: 10 (1889); Baker & Wright: 96 (1909); Walter: 36 (1909); Heimerl: 155 (1934); Adamson: 363 (1950); Webb: 112 (1964); Nowicke: 303 (1968); Polhill: 1 (1971); Hewson: 1 (1984); Brown & Varadarajan: 49 (1985); Stannard: 164 (1988); Rohwer: 512 (1993).

Herbs or shrublets, rarely trees, sometimes scandent; plants sometimes dioecious. **Leaves** sometimes ± succulent. **Inflorescences** terminal or axillary racemes, spikes or panicles; pedicels bracteate and bibracteolate. **Flowers** bisexual or unisexual, ± regular. **Tepals** 5, aestivation quincuncial, rarely 4, equal, oblong, spreading or reflexed. **Stamens** 5–30, functional or rudimentary; filaments subulate, free, adnate to base of tepals or emerging from rim of narrow ring; anthers oblong. **Gynoecium** of 5–16 free or slightly connate carpels; ovule solitary and basal; styles equal in number to carpels, free or connate at base. **Fruit** an aggregation of 1-seeded, lobed berries or a syncarpous, lobed berry, rounded or depressed-globose, fleshy, thin-skinned. **Seed** lenticular or reniform, beaked or obtuse at base; testa black and brittle. $x = 9$ (polyploidy).

Species ± 25, frequently hybridising; in tropical or subtropical regions, mainly in America, few in Africa and Asia; often weedy; 4 in sthn Afr., Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape; **Phytolacca dioica* L., an ornamental tree with a huge, soft-wooded trunk, sometimes occurs as an escape.

***Rivina** L. 2370000

Linnaeus: 121 (1753); Linnaeus: 57 (1754); Moquin-Tandon: 10 (1849a); Hooker: 80 (1880); Heimerl: 8 (1889); Walter: 101 (1909); Heimerl: 147 (1934); Nowicke: 332 (1968); Polhill: 6 (1971); Hewson: 4 (1984); Stannard: 169 (1988); Rohwer: 512 (1993); Thulin: 126 (1993).

Soft herbs, sometimes suffrutescent and woody at base; stems erect or straggling. **Leaves** elliptic to ovate, with long petioles. **Inflorescences** racemes, terminal and axillary, suberect, many-flowered. **Flowers** bisexual, regular. **Tepals** 4, ± free, subequal, oblong-elliptic, rounded or acute at apex, erect or spreading in fruit. **Stamens** 4; filaments free; anthers dorsifixed, linear. **Ovary** ± subglobose, ± compressed laterally, unicarpellate; style short but distinct, curved; stigma capitate. **Fruit** a berry, globose, orange, red or purple, juicy; pericarp thin, adherent to seed. **Seed** 1, discoidal; testa crustaceous, black, often pubescent. $x = 9$ (high polyploidy).

Monotypic: **Rivina humilis* L., native to tropical and subtropical America and introduced into the Old World; a garden weed of scattered distribution, mainly in Gauteng, KwaZulu-Natal and Eastern Cape.

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Piperaceae

(Magnoliidae—Piperales)

Compiled by M. Jordaan

Perennial or annual herbs or shrubs, terrestrial or epiphytic, with creeping, decumbent or erect, often succulent stems, often with swollen nodes, sometimes aromatic, with spherical oil cells; sometimes dioecious or monoecious but usually with bisexual flowers; stems with scattered vascular bundles; indumentum of simple or multicellular hairs or 0; pearl glands and clear or coloured pellucid glands often present. **Leaves** alternate, opposite or verticillate, succulent or membranous, simple, entire, pinnately or palmately nerved, petiolate; stipules 0 or adnate to petiole. **Inflorescence** usually a dense spike, or racemose, axillary, terminal or leaf-opposed, pedunculate. **Flowers** bisexual, sometimes unisexual, hypogynous, minute, each subtended by a peltate bract. **Perianth** 0. **Stamens** 2; filaments free to partly fused; anthers often articulated on filaments, with 2 distinct or confluent thecae, with longitudinal slits. **Ovary** superior, with 1 or 2 fused carpels, 1-locular; ovule solitary, basal, erect, orthotropous; styles 1–4(5), short, relatively long or 0; stigmas 1 or 2, capitate, linear or penicillate. **Fruit** a drupe, indehiscent, sometimes viscid, with a succulent, thin or dry pericarp. **Seed** 1, ± globose, ovoid, or oblong in outline, with testa usually membranous or rather fleshy; endosperm sparse; perisperm copious; embryo minute.

Genera ± 15, species ± 2 000, pantropical, mostly in rain forests; sthn Afr.: genera 2, species 6. The herbaceous *Peperomia* and some related genera are sometimes placed in a separate family, the Peperomiaceae (Airy Shaw 1973), that differs from *Piper* mainly in being herbaceous; it has even more reduced flowers, comprising a single carpel and two anthers subtended by one bract. *Piper nigrum* L. is the source of pepper.

Agardh: 201 (1824); Miquel: 1 (1843–1844); Endlicher: 14 (1847); Candolle: 235 (1869); Bentham: 125 (1880); Engler: 3 (1888); Yuncker: 1 (1958); Airy Shaw: 905 (1973); Burger: 345 (1977); Tebbs: 516 (1993); Diniz: 69 (1996); Verdcourt: 1 (1996); Diniz: 24 (1997).

Key to genera

Herbs, usually epiphytic, often succulent and brittle; stipules absent; anther thecae usually confluent; stigma 1 ..... **Peperomia**

Terrestrial herbs, climbers, shrubs or trees, never succulent; stipules adnate to petiole; anther thecae usually distinct; stigmas 2 ..... **Piper**

Peperomia Ruiz & Pav. 1866000

Ruiz López & Pavón: 8 (1794); Endlicher: 15 (1847); Candolle: 392 (1869); Bentham: 132 (1880); Engler: 10 (1888); Baker & Wright: 147 (1909); Wright: 489 (1912); Balle: 380 (1942); Yuncker: 1 (1958); Airy Shaw: 871 (1973); Düll: 56 (1973); Van Jaarsveld: 67 (1992); Tebbs: 519 (1993); Diniz: 73 (1996); Verdcourt: 9 (1996); Diniz: 29 (1997).

Verhuellia Miq.: 45, 47 (1843–1844).

Annual or perennial, terrestrial or epiphytic herbs, erect, repent or scandent; stems soft, brittle, glabrous or pubescent, often succulent, rarely more than 1 m high, sometimes with stout fleshy rhizomes. **Leaves** alternate, opposite or verticillate, sometimes peltate, thin to thick and succulent, glabrous or pubescent with simple or branched hairs, 3- or penninerved, palmate or pinnate with yellow or brown pellucid glands; petioles sometimes sheathing; stipules 0. **Inflorescence** a spike, terminal or opposite leaves, solitary or several together; bracts sessile, usually peltate. **Flowers** bisexual, many, congested or lax, borne on surface or in pit-like depressions of rachis, usually white, cream or green, sessile or

shortly pedicellate; floral bracts round or ovate, peltate, glabrous or fimbriate, usually with gland dots. **Stamens** 2, borne at base of ovary, soon deciduous; filaments short and fused; anthers subglobose or ellipsoid, with 2 confluent thecae. **Ovary** sessile, obtuse or acute; stigma 1, undivided, often penicillate. **Fruit** a drupe, sessile or stipitate, rounded or with a small style, with an elongate, straight, bent or hooked beak, smooth or viscid-verruculose; pericarp thin; endocarp slightly hardened. $x = 11$ (12) (aneuploids, polyploidy).

Species ± 1 000, pantropical with its main centres of diversity in tropical South America; 17 species in Africa; 5 in sthn Afr.: Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, coastal areas of Western and Eastern Cape.

Piper L. 1862000

Linnaeus: 28 (1753); Linnaeus: 18 (1754); Kunth: 561 (1839); Endlicher: 16 (1847); Candolle: 240 (1869); Bentham: 129 (1880); Engler: 6 (1888); Baker & Wright: 146 (1909); Wright: 488 (1912); Balle: 369 (1942); Yuncker: 1 (1958); Täckholm & Drar: 361 (1969); Killick: t. 1583 (1970); Airy Shaw: 995 (1973); Tebbs: 518 (1993); Verdcourt: 1 (1996); Diniz: 70 (1996); Diniz: 25 (1997).

Lepiauthes Raf.: 84 (1838). *Pothomorphe* Miq.: 450 (1839), 36 (1840).

Herbs, soft-wooded shrubs, subshrubs, or rarely small trees, erect or reclining, sometimes scrambling, glabrous or pubescent; stems often hollow, thickened at nodes and occasionally producing adventitious roots; a single prophyll present at shoot apex, sometimes hidden by sheathing petiole, or rarely 0. **Leaves** alternate, entire, symmetrical or asymmetrical, occasionally peltate, sometimes lobed at base, membranous or coriaceous, glabrous or often glandular or ciliate; clear or variously coloured pellucid glands often present, venation penninerved, palmate or pinnate; petiolate, sometimes sheathing stem, sometimes with a stipule-like structure at base. **Inflorescences** leaf-opposed, solitary, peduncular, ascending-arching, distally drooping spikes. **Flowers** bisexual or female, either both on one spike or on separate spikes, sessile or pedicellate, widely spaced or crowded together on an often fleshy rachis; floral bracts round, triangular, semilunar or calceiform, sometimes with elongated bases, glabrous or ciliate, pedicellate. **Stamens** 2; anthers basifixed with thecae usually distinct. **Ovary** sessile; styles long, short or 0; stigmas 2. **Fruit** dry or fleshy, often immersed in a succulent rachis, with minute beak, green, red-brown or black, glabrous to densely puberulous, occasionally glandular. $x = 13$ (10, 12, 14, 39) (high polyploidy).

Species ± 1 000, cosmopolitan in warmer regions of both hemispheres, only 3 species in Africa; often pioneers of disturbed areas such as wood or track edges and landslides; I in sthn Afr.: *Piper capense* L.f., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

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Pittosporaceae

(Rosidae—Rosales)

Compiled by M. Jordaan

Small, usually evergreen, resinous trees or shrubs; schizogenous secretory canals present. **Leaves** alternate, sometimes clustered towards apex of branchlets, simple, ovate, obovate, spathulate, lanceolate or linear, usually entire, sometimes undulate, rarely subserrate or shallowly lobed, glabrous or pilose, petiolate or subsessile; stipules 0. **Inflorescences** variously paniculate or subracemose, terminal or terminal with axillary branches, rarely fascicled. **Flowers** bisexual or more often functionally unisexual with large rudiments of nonfunctional sex organs in all flowers, regular, hypogynous, sweet-scented. **Sepals** 5, free or slightly connate, imbricate or not, glabrous or pubescent. **Petals** 5, free or slightly connate or connate up to about the middle, with claws sometimes connivent and blades usually spreading or revolute, imbricate in bud, white, yellow or greenish. **Stamens** 5, alternating with petals, about as long as petals; filaments linear; anthers erect, ovate-oblong, dehiscing by means of longitudinal slits. **Ovary** superior, of 2 carpels, paracarpous, usually 1-locular, sessile or shortly pedicellate; ovules few, ovoid, anatropous, unitegmic, on parietal

placentas; style simple, short, sometimes conical; stigma simple, capitate or 2-lobed. **Fruit** a ± globose or ovoid capsule; valves often 2, entire, leathery or woody, yellow or brown, erect or spreading or reflexed, sometimes splitting through the persistent style. **Seeds** 4–8 per valve, in 2 rows on each parietal placenta, 3- or 4-angled on one side, convex on other side, orange to red, covered with a sticky, slow-drying resin. $x = 12$.

Genera 9; species ± 200, native mostly to the Old World tropics and subtropics, from Africa to Pacific, 8 genera endemic to Australasia, not in America; sthn Afr.: genus 1, species 3 (2 exotic).

Brown: 542 (1814) as Pittosporeae; Candolle: 345 (1824); Endlicher: 1081 (1840); Sonder: 443 (1860); Bentham: 130 (1862); Pax: 106 (1891); Pritzel: 265 (1928); Cufodontis: 298 (1960); Cufodontis: 1 (1966); Friis: 319 (1987); Mabberley: 562 (1997).

Pittosporum Banks ex Sol. 3252000

Solander: 286 (1788); Candolle: 345 (1824); Endlicher: 1082 (1840); Sonder: 443 (1860); Bentham: 130 (1862); Oliver: 124 (1868); Pax: 110 (1891) as Pittosporaceae; Pritzel: 268 (1928); Cufodontis: 105 (1951); Cufodontis: 27 (1952); Cufodontis: 298 (1960); Franco: 383 (1964); Cufodontis: 1 (1966); Friis: 319 (1987); Friis: 1 (1989); Judd: 15 (1996).

Description as for family.

Species ± 150, Macaronesian Islands, Africa, Madagascar and Mascarenes, Sri Lanka, Indonesia, the tropical and warm temperate parts of the Asian mainland, as far north as China to Australia, New Zealand, New Guinea, New Caledonia and Polynesia, including Hawaii; 1 indigenous in sthn Afr.: *Pittosporum viridiflorum* Sims, Northern Province, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape; 2 introduced species in KwaZulu-Natal, Western and Eastern Cape.

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Plantaginaceae

(Asteridae—Plantaginales)

Compiled by W.G. Welman

Annual or perennial herbs, acaulescent or sometimes caulescent. **Leaves** usually all in a basal rosette, sometimes (in perennials) cauline, alternate, amplexicaul, simple, usually entire, with parallel venation; stipules 0. **Flowers** usually bisexual, regular, small, bracteate, arranged in dense terminal spikes on long, erect, leafless stalks. **Calyx** 4-lobed; lobes imbricate, lanceolate, sometimes 2 obovate and 2-ribbed, the other 2 concave, keeled and ciliate on upper part of keel, usually with membranous margins. **Corolla** 4-lobed, membranous; tube ampulliform or cylindric, short. **Stamens** 4, arising in mouth of corolla tube, alternating with lobes, exserted; filaments filiform; anthers 2-thecous, dehiscing by longitudinal slits, versatile, minutely apiculate. **Ovary** superior, 2-locular, globose, with 1–many ovules in each locule, on axile placentas; style usually far exserted and villous; stigma simple. **Fruit** a membranous capsule, dehiscing circumscissily at the middle or near base. **Seeds** mostly 2–4 per capsule (± 15–25 in *P. major* L.), usually ± boat-shaped, with broad groove on face, sometimes triangular, gelatinous when wetted. $x = 5, 6, 10, 12$ (4, 7, 8, 9, 11) (B-chromosomes, aneuploids, polyploidy).

Genera 3, species 255, cosmopolitan, mainly in temperate regions; sthn Afr.: genus 1, species ± 12. See also notes under Scrophulariaceae.

Cooke: 387 (1910) as Plantagineae; Pilger: 1 (1937); Levyns: 729 (1950); Verdcourt: 1 (1971); Lehmann: 9 (1988); Glen: 151 (1998).

Plantago L. 8116000

Linnaeus: 112 (1753); Cooke: 388 (1910); Glen: 151 (1998).

Description as for family.

Species ± 250, cosmopolitan; ± 12 in sthn Afr., at least 5 introduced, 5 restricted to sthn Afr., 2 widely distributed weeds, doubtfully indigenous, often in damp situations.

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Plumbaginaceae

(Caryophyllidae—Plumbaginales)

Compiled by C.L. Bredenkamp

Shrubs, lianes, or herbs. **Leaves** alternate, simple, entire to lobed, sometimes auriculate, rarely scaly; foliage usually with scattered chalk glands exuding water and calcium salts, and often with raised mucilage glands; stipules 0. **Inflorescence** bracteate, racemose or often cymose (thyrsic), simple or compound; bracts often sheathing, dry and membranous; bracteoles 2(1). **Flowers** bisexual, regular, often heterostylous. **Calyx**: sepals 5, ± fused into a 5- or 10-ribbed tube ending in 5 teeth or lobes, often membranous and petaloid, persistent. **Petals** 5, connate or ± free, often persistent; lobes convolute. **Disc** often present, sometimes as 5 glands alternating with stamens. **Stamens** 5, opposite corolla lobes; filaments mostly free in Plumbaginoideae, basally adherent to petals in Staticoideae; anthers tetrasporangiate, dithecal, opening lengthwise. **Ovary** superior, 5-carpellate, 1-locular, with 5 distinct styles or a single, apically lobed style; stigmas dry, papillate, capitate to cylindric; ovule solitary, basal, anatropous, bitegmic, crassinucellar, on a slender funicle. **Fruit** a dry, membranous, 1-seeded achene, partly or wholly enclosed by the persistent calyx, or a circumscissile capsule sometimes splitting upwards into 5 valves. **Seed** with a straight embryo and with copious endosperm often containing solitary starch grains. usually $x = 6–9$.

Genera ± 27, species 650, distributed throughout the world, especially in the Mediterranean and Irano-Turanian regions; sthn Afr.: genera 4, species 24; generally heliophilous, and often psammophilous and halophilous.

Jussieu: 92 (1789) name conserved; Brown: 413 (1810); Spach: 334 (1841); Boissier: 617 (1848); Oliver: 485 (1877); Pax: 116 (1889); Kuntze: 393 (1891); Wright: 418 (1906); Adamson: 665 (1950); Rickett & Stafleu: 78 (1960); Dyer: 488 (1961); Dyer: 15 (1963); Kubitzki: 523 (1993). Limoniaceae Lincz.: 166 (1979).

Two subfamilies are recognised, namely Plumbaginoideae including *Plumbago* L. and *Dyerophytum* Kuntze, and Staticoideae Kusn. including *Afrolimon* Lincz. and *Limonium* Mill. Both subfamilies are supported by the wood anatomical study of Carlquist & Colby (1996).

Key to genera

1a Styles united throughout their length, except for the fairly long stigmas; petals ± connate:
  2a Calyx tube setose with long, often glandular-capitate setae ..... **Plumbago**
  2b Calyx tube membranous, appearing winged, strongly transversely wrinkled..... **Dyerophytum**
1b Styles free from the base; petals free or connate at base only:
  3a Stigmas very small, capitate; inflorescence corymbose; spikes short, spicules laxly arranged, 1-flowered ..... **Afrolimon**
  3b Stigmas filiform-cylindrical; inflorescence a panicle with terminal, one-sided spikes; spikes lax or compact, spicules 1–8(–12)-flowered..... **Limonium**

Afrolimon Lincz. 6351010

Linczevski: 167 (1979); Kubitzki: 529 (1993).

Statice section *Circinaria* Boiss.: 617 (1848).

Perennial dwarf shrubs or shrubs. **Inflorescence** corymbose. **Spikes** short; spicules laxly arranged, 1-flowered, 3-bracteate. **Calyx** broadly infundibuliform, after anthesis expanded; tube 5-costate. **Styles** free from the base, glabrous. **Stigmas** very small, capitate.

Species ± 7 in sthn Afr., endemic to Northern and Western Cape.

Dyerophytum Kuntze 6345000

Kuntze: 394 (1891); Dyer: 19 (1963); Roessler & Schreiber: 1 (1967); Kubitzki: 527 (1993).

Vogelia Lam.: 148, t. 149 (1792); Wright: 425 (1906).

Shrublets or shrubs, ± scaly. **Leaves** alternate, entire. **Inflorescences** dense, terminal spikes; bracts and bracteoles small. **Calyx**: tube 5-winged and with 5 strong midribs, strongly transversely wrinkled, ending in 5 teeth, persistent. **Corolla** funnel-shaped, 5-lobed. **Stamens**: anthers oblong, emarginating at base. **Ovary** ± 5-angled; style terminal, with 5 branches, hairy, stigmatose on inner surfaces. **Capsule** circumscissile at base and splitting upwards into 5 valves.

Species 3, India, Arabia, Socotra and Africa; 1 in sthn Afr.: *Dyerophytum africanum* (Lam.) Kuntze, Namibia, Northern and Western Cape.

Limonium Mill. 6351010

Miller: [790] (1754) name conserved; Adanson: 283 (1763); Jussieu: 92 (1789); Sprague: 267 (1924); Adamson: 665 (1950); Rickett & Stafleu: 78 (1960); Dyer: 20 (1963); Roessler & Schreiber: 2 (1967); Kubitzki: 529 (1993).

Statice L.: 274 (1753) in part; Linnaeus: 135 (1754) in part; Miller: 1328 (1754); Adanson: 283 (1763); Endlicher: 349 (1837); Boissier: 634 (1848); Wright: 419 (1906); Sprague: 267 (1924).

Perennial herbs or small shrubs, old portions of stems often covered by persistent leaf bases. **Leaves** usually in basal rosettes, but densely leafy branches sometimes present, obovate, oblanceolate, spathulate or linear. **Inflorescence** a panicle with terminal, one-sided spikes; spikes lax or compact, of 1–8(–12)-flowered spikelets; scapes terete, erect, spreading or decumbent, glabrous or occasionally pubescent, smooth or more often variously lepidote or rough, with raised pits or glands; bracts on scape and its branches scale-like, 2 subtending each spikelet, inner one of which generally more membranous than other; spikelet consisting of a comparatively large bract with membranous margin enveloping 1–several flower buds, each one of which subtended by a membranous bracteole. **Calyx** usually infundibuliform, obconical or tubular, ribbed, membranous and slightly or horizontally expanded in upper portion, limb hyaline, 5(rarely 10)-lobed. **Corolla**: petals 5, longer than calyx, divided nearly to base or with a short tube. **Stamens** 5, attached to petals near base; filaments slender; anthers oblong, versatile, divided up to point of attachment (halfway). **Ovary** 5-angled, with an apical projection into ovary chamber to near top of ovule; styles 5, free at base, filiform, folded in bud, arising from top of angles of ovary; distyly occurs; stigmas cylindrically filiform. **Fruit** a capsule with solitary seed. $x = 9$ (5, 6, 7, 8, 11, 13) (aneuploids, high polyploidy).

Species ± 350; maritime and arid regions of northern hemisphere, Africa and Australia, mainly in the Mediterrancan; especially in coastal habitats, several species are valuable ornamentals; 11 in sthn

Afr., in Namibia, KwaZulu-Natal, Northern, Western and Eastern Cape.

Plumbago L. 6343000

Linnaeus: 151 (1753); Linnaeus: (1754); Jussieu: 92 (1789); Brown: 425 (1810); Endlicher: 349 (1837); Boissier: 690 (1848); Hooker: 624 (1876); Oliver: 486 (1877); Wright: 424 (1906); Dyer: 16 (1963); Roessler & Schreiber: 3 (1967); Kubitzki: 527 (1993).

Shrubs, shrublets, or subherbaceous. **Leaves** alternate, auricled at base or petiole amplexicaul. **Inflorescence** a terminal elongate spike or raceme. **Calyx** 5-lobed, tubular, outside covered with setae, mostly glandular, sessile or stalked glands, hyaline between the 5-ribs, persistent. **Corolla** funnel-shaped, 5 lobes spreading, tube longer than calyx; blue, red or white. **Stamens** free, broadened at base; filaments filiform from a dilated base pressed to ovary; anthers linear-oblong. **Ovary** ± conical; style terminal, filiform, hairy, divided above into 5 branches, stigmatic along their inner surface; distyly occurs. **Capsule** membranous, circumscissile near base, the caducous part often splitting towards apex with 5 valves. $x = 7$ (6, 8) (polyploidy).

Species ± 24, in warmer regions of both hemispheres; 5 in sthn Afr., widespread in all countries and provinces, rarely common.

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Podostemaceae

(Rosidae—Podostemales)

Compiled by R.P. Glen

Submerged, annual or perennial herbs, growing attached to rocks in swift-flowing freshwater, especially rapids or waterfalls; often resembling mosses, liverworts or algae; all vegetative parts of plant chlorophyllous; plant base a polymorphous dorsiventral thallus giving rise to haptera (flattened organs adhering to substrate by a cement-like substance) and to stems and flowering shoots. **Stems** simple or with short branches, leafless to densely leafy, or reduced and present only in flowering and/or well-developed plants. **Leaves** often linear to filiform and floating, entire or divided, and/or small, moss-like, or reduced and bract-like; stipules 0 or tooth-like. **Flowers** bisexual, regular or irregular, small, solitary or cymose; spathella (closed membranous sac enclosing flower bud and bursting irregularly at anthesis) persistent or 0. **Perianth** with 2, 3 or 0 segments, free or connate at base. **Stamens** 1 or 2, hypogynous; filaments free or ± connate; anthers 2-thecous, opening lengthwise; pollen grains in diads or monads. **Ovary** superior, 1–3-locular; placenta central, swollen, multi-ovulate; septa thin; styles 2 or 3, basally ± fused. **Fruit** a septicidal, often ribbed capsule. **Seeds** many, minute; endosperm 0; epidermis becoming mucilaginous when moistened.

Genera ± 51; species ± 268 (including Tristichaceae); widely distributed throughout the tropics and subtropics of Old and New World; sthn Afr.: genera 4, species 4. Most of the species are endemic to a small geographical area, some confined to a single river.

Hill: 482 (1912); Podlech: 62 (1966); Obermeyer: 205 (1970); Aston: 1 (1990); Cook: 175 (1990); Philbrick & Novelo: 210 (1995); Cusset: 1 (1997).

Key to genera

1a Spathella absent; perianth equally 3-partite, fused below; plants moss-like ..... **Tristicha**

1b Spathella present, enveloping bud, splitting irregularly, persistent; perianth consisting of 2 minute, subulate segments or 0:

2a Capsule smooth or ribs very faint; ovary erect inside spathella, shortly stipitate ..... **Letestuella**

2b Capsule ribbed; ovary recurved inside spathella, on a long pedicel:

3a Capsule ovoid to ellipsoid, 10-ribbed, with all ribs running entire length of capsule, opening by 2 subequal valves; one or both persistent ..... **Ledermanniella**

3b Capsule globose to subglobose, with 8 wide ribs, opening by 2 unequal valves, larger one persistent ..... **Sphaerothylax**

Ledermanniella Engl. 3151020

Engler: 378 (1909); Obermeyer: 208 (1970).

Inversodicraea Engl.: 271 (1915); Obermeyer: 208 (1970); Cusset: 361 (1983).

Small to fairly robust herbs, sometimes with thalloid bodies only or developing stems on which leaves and inflorescences are borne. **Stems** erect, branched, woody, often sparsely to densely covered with small, imbricate leaves or bracts. **Leaves** dimorphous: (a) floating, linear, often branching dichotomously; (b) bract-like, hard, often dentate, in many species covering the abbreviated, fertile shoots. **Flowers** single in axils of bract-like leaves, aggregated towards apices; spathella obovoid, apiculate, splitting laterally, apex remaining intact; flower recurved in spathella, becoming erect at anthesis, pedicelled. **Perianth** 0 or of 2 minute, subulate segments situated on each side of stamen(s). **Stamens** 1 or 2, if 2, with filaments fused nearly to apex; pollen in monads or diads. **Ovary** ovoid to fusiform; styles 2, subulate, papillate, usually recurved. **Capsule** ovoid to ellipsoid, 10-ribbed, with all ribs running entire length of capsule, opening by 2 subequal valves; one or both persistent.

Species ± 15; 1 in sthn Afr.: *Ledermanniella warmingiana* (Gilg) C.Cusset, Kunene River, Namibia.

Letestuella G.Taylor 3152010

Taylor: 57 (1953); Cusset: 207 (1980); Cook: 183 (1990).

Leiothylax sensu Obermeyer: 208 (1970).

Roots thalloid. **Stems** elongated, branching up to 50 mm long. **Leaves** linear or forked with linear segments, up to 40 mm long, often with stipule-like teeth at base. **Flowers** solitary or in irregular clusters, subsessile at anthesis; pedicel elongating to ± 10 mm long in fruit; spathella oblong-ovoid, becoming campanulate with revolute teeth after rupturing. **Perianth** of 2 segments, one on each side of andropodium. **Stamens** (1)2; pollen in monads. **Ovary** 1-locular; stigmas 2, linear. **Capsules** globose, smooth, opening by equal and caducous valves.

Species 1: *Letestuella tisserantii* G.Taylor, Kunene River, Namibia. *Leiothylax warmingii* sensu Podlech: 1 (1966) and Obermeyer: 208 (1970) is, according to Cusset: 209 (1980), most probably *Letestuella tisserantii*. The genus *Leiothylax* with 3 species in tropical Africa has not been recorded from sthn Afr.

Sphaerothylax Bisch. 3159000

Bischoff: 426 (1844); Hill: 483 (1912); Obermeyer: 209 (1970); Cook: 188 (1990).

Herbs with a basal, thaloid body closely appressed to substrate (resembling *Marchantia*); upper branches, if developed, erect, slender, with leaves and flowers congested at nodes. **Leaves** either repeatedly forked into linear segments or scale-like. **Flowers** solitary or aggregated both on thallus and in axils of leaves on elongated stems, subtended by some rough, open bracts (reduced leaves); spathella obovoid, splitting irregularly, forming an open, funnel-shaped cup; pedicels up to 2 mm long. **Perianth** of 2 subulate segments. **Stamens** 2, with filaments fused to apex. **Ovary** 1-locular, ovoid, sessile or shortly stipitate; styles 2. **Capsule** globose to subglobose, with 8 wide ribs, opening by 2 unequal valves, larger one persistent. **Seeds** flattened, ovate, smooth, black.

Species 2 or perhaps more, Madagascar and tropical Africa; 1 in sthn Afr.: *Sphaerothylax algiformis* Bisch., along the eastern escarpment from Mpumalanga to the Eastern Cape.

Tristicha Thouars 3140000

Thouars: 3 (1806); Podlech: 1 (1966); Obermeyer: 206 (1970).

Moss-like plants, with haptera, and filiform to linear, creeping roots. **Stems** branching freely and sympodially, giving off leafy shoots and abbreviated flowering shoots. **Leaves** tristichous with 2 lateral and one dorsal row, closely imbricate, sessile, simple, small, ovate, consisting of one layer of cells in thickness. **Flowers** terminal and/or axillary, surrounded at base, with 2 or 3 free bracts; pedicels erect, sometimes short. **Perianth** usually marcescent, consisting of 3 lobes united at base. **Stamens** 1, hypogynous; filaments filiform; anthers apiculate. **Ovary** sessile, 3-locular with a swollen, triangular placenta; styles 3, short, linear, with stigmatic area decurrent on inside. **Capsule** ovoid, ribbed, septicidally 3-valved, 1 valve breaking away.

Species 2, 1 in Australia, the other: *Tristicha trifaria* (Bory ex Willd.) Spreng., tropical America, Africa and the Mascarene Islands; sthn Afr.: Namibia, Mpumalanga, KwaZulu-Natal and Eastern Cape.

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Polygalaceae

(Rosidae—Polygalales)

Compiled by C.L. Bredenkamp

Herbs, shrubs, undershrubs or small trees. **Leaves** alternate, sometimes fascicled, rarely opposite, simple, entire; stipules 0. **Flowers** bisexual, irregular, usually solitary, axillary or terminal, sometimes in spikes, racemes, or rarely panicles; superficially resembling flowers of papilionaceous Fabaceae. **Sepals** 5, free, imbricate; the 2 lateral interior ones often resembling wing petals. **Petals** 3 or 5, united at base and adnate to staminal tube, lowest boat-shaped, crested or

with wing-like appendages below apex; lateral petals small, simple or bifid; posterior one frequently absent. **Stamens** 8(7) or 5(4); filaments usually connate into a slit tube, rarely free; anthers 1- or 2-thecous, usually opening by a longitudinal slit, pore or valve. **Disc** annular, around base of ovary, sometimes present. **Ovary** superior, 2(3 or 5)-locular, rarely 1-locular by abortion, with axile placentas and 1 pendulous ovule in each locule; style simple, often dilated and 2-lobed at apex, 1 lobe stigmatic, the other often ending in a tuft of hairs. **Fruit** a capsule, samara, or drupe. **Seeds** often hairy, often with aril.

Genera 80, species > 950, cosmopolitan in most warm and temperate countries; sthn Afr.: genera 5, species 211. Paiva (1998) resurrected the genus *Heterosamara* Kuntze, represented in sthn Afr. by *H. galpinii* (Hook.f.) Paiva (= *Polygala galpinii* Hook.f.).

Harvey: 79 (1860) as Polygaleae; Exell: 307 (1960); Friedrich-Holzhammer & Merxmüller: 1 (1968); Paiva: 117 (1998).

Key to genera

1a Ovary 1 (2)-locular; fruit a samara (dry, winged, does not split open) ..... **Securidaca**
1b Ovary 2- or 3-locular; fruit a capsule or drupe:
  2a Fruit a drupe (fleshy) ..... **Nylandtia**
  2b Fruit a capsule, 2-locular:
    3a Sepals unequal, laterals larger than others, often coloured and wing-like ..... **Polygala**
    3b Sepals subequal ..... **Muraltia**

Muraltia DC. 4278000

Candolle: 335 (1824); Harvey: 95 (1860); Levyns: 1 (1954); Levyns: 9 (1955); Exell: 307 (1960).

Undershrubs or shrubs, sometimes ericoid. **Leaves** usually fascicled, sometimes scattered. **Flowers** solitary, axillary, small, subsessile. **Sepals** dry, membranous, subequal, the 2 lateral ones slightly or much larger than others. **Petals** 3; the lower hooded, with 2 large, wing-like appendages below apex, rarely with only 1 appendage; lateral petals free or cohering by their edges. **Stamens** 7; filament tube usually inflated about the middle; anthers 1-thecous, dehiscing by a longitudinal slit. **Ovary** 2-locular, 4-horned, sometimes hairy; style curved near apex, usually 2-lobed; stigma usually lateral, rarely discoid. **Fruit** a membranous capsule, 2-seeded, compressed, usually with 4 horns or tubercles, sometimes hispid. **Seeds** with aril produced into membranous flaps on either side.

Species 115, Africa; *Muraltia flanaganii* Bolus from Tanzania southwards, 4 in KwaZulu-Natal and Eastern Cape and all others endemic in Cape Floristic Region (Western and S Eastern Cape).

Nylandtia Dumort. 4279000

Dumortier: 31 (1822); Bullock: 202 (1965); Johnson & Weitz: 230 (1991).

Mundia Kunth: 392 (1823) in part; Harvey: 95 (1860) as '*Mundtia*'; Dyer: 249 (1967).

Spiny, branched shrubs up to 4 m high; young twigs and branchlets spine-tipped. **Bark** greyish olive-green becoming rusty brown to grey, smooth to finely fissured to rough; young branchlets olive-green, grooved, smooth when fresh, becoming rugulose. **Leaves** fasciculate or scattered, small, glabrous, oblong, linear or elliptical, spine-tipped. **Flowers** solitary, but often in pseudoracemes, axillary, purple, pink or white, pedicel present, hirsute; bracts 4, imbricate, cordate, ciliate. **Sepals**: 3 outer ones 1–2 mm long, ovate, subobtuse, ciliate, green with purplish pink tips; 2 inner (lateral) ones petaloid, much larger than outer ones, elliptic, wing-like, persistent, pink, purple or white. **Petals** 3; anterior one keel-like, enclosing stamens, with a lobed multifid crest (appendages) below apex; lateral ones oblong, as long as anterior one. **Stamens** 7; filament tube pilose above; anthers 2-thecous, linear, dehiscing by a longitudinal slit. **Ovary** narrowly obovate; style stout, branching at apex into one vertical and one horizontal lobe, stigma on horizontal lobe. **Fruit** a rounded drupe, up to 8 mm in diameter, fleshy, red, 1- or 2-seeded. **Seeds** sparsely pubescent, without aril; cotyledons small, oblong; endosperm scanty.

Species 1: *Nylandtia spinosa* (L.) Dumort., Western and Eastern Cape: 2 varieties are recognised: type variety occurs as far north as Nababeep (Namaqualand, Northern Cape) and along south coast to Grahamstown (Eastern Cape); var. *scoparia* is in the Clanwilliam District (Western Cape).

Polygala L. 4273000

Linnaeus: 701 (1753); Harvey: 80 (1860); Levyns: 9 (1955); Exell: 307 (1960); Friedrich-Holzhammer & Merxmüller: 1 (1968); Paiva: 205 (1994); Paiva: 137 (1998).

Herbs, undershrubs, or shrubs. **Leaves** alternate, rarely opposite. **Flowers** papilionaceous, in terminal or lateral racemes or occasionally solitary. **Sepals** unequal; 3 outer ones usually sepaloid and 2 inner ones (wings) larger and petaloid, all free or 2 anterior ones united. **Petals** 3–5; lower one keel-shaped, usually with a multifid crest below apex; 2 lateral ones usually reduced, and posterior one often absent. **Disc** sometimes present. **Stamens** (4 or 5)8(9), rarely 7 fertile with 1 staminode. **Ovary** 2-locular; style curved or bent; stigma oblique. **Fruit** a membranous capsule, compressed. **Seeds**: sometimes only 1 developed, usually with a silky indumentum and an aril. $x = 17$ (7, 8, 9, 10, 11, 12, 13, 16, 19, 23) (polyploidy).

Species ± 600, cosmopolitan in temperate and warm countries, the 232 African and Madagascan taxa belong to two subgenera: *Chamaebuxus* and *Polygala*; ± 88 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho and with many concentrated in the S Western Cape.

Securidaca L. 4275000

Linnaeus: 707 (1753); Linnaeus: 316 (1754) in part; Linnaeus: 1155 (1759) name conserved; Exell: 304 (1960); Friedrich-Holzhammer & Merxmüller: 8 (1968); Johnson: 5 (1987).

Small trees or shrubs, sometimes spiny. **Leaves** alternate. **Flowers** in terminal and axillary racemes or panicles. **Sepals** unequal, 2 large, coloured, wing-like. **Petals** 3(5), free, adnate below to staminal tube; median one hooded; if 5 present, then 2 upper scale-like. **Stamens** 8; filaments linear, connate into a split tube which is sometimes ciliate; anthers 2-thecous, opening by a triangular, recurved, frontal valve. **Ovary** 1(2)-locular; style arising obliquely on ovary, flattened above; stigma terminal. **Fruit** a samara, sometimes reticulated. **Seeds** globose, with loose, membranous inner seed coat. $x = 16$ (1 report).

Species ± 80, Africa, America, Asia; 1 in sthn Afr.: *Securidaca longepedunculata* Fresen., Namibia, Botswana, Northern Province, North-West, Gauteng and Mpumalanga.

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Polygonaceae

(Caryophyllidae—Polygonales)

Compiled by G. Germishuizen

Annual or perennial herbs, shrubs or climbers, sometimes monoecious; stems often with swollen nodes. **Leaves** alternate and penninerved, simple, margins usually entire; stipules usually conspicuous and united with base of petiole to form a tubular, persistent or deciduous, membranous to hyaline, often bilobed or fringed sheath (ocrea), or sometimes much reduced or absent. **Inflorescence** an axillary or terminal, simple or branched thyrse. **Flowers** bisexual or unisexual, regular, small, with articulate pedicel. **Perianth**: segments 2–6, basally connate into a minute to conspicuous floral tube, green or coloured, commonly in 2 similar to slightly dissimilar whorls of 3 segments, sometimes in one whorl of 5, mostly persistent and sometimes accrescent in fruit. **Stamens** usually 6–9, arising at base of perianth forming a distinct ring; filaments free or connate at base; anthers 2-thecous, dehiscing lengthwise. **Disc** annular. **Ovary** superior, sessile, 3-angled or lenticular, 1-locular, with a solitary, basal, sessile or stalked ovule; styles 1–3, distinct or proximally united; stigmas filiform, peltate or capitate, entire or variously fringed. **Fruit** an achene or small nut, trigonous or sometimes lenticular, sometimes winged or spinescent. **Seed** sometimes subterete.

Genera ± 43, species ± 1100, cosmopolitan in a wide range of habitats; sthn Afr.: genera 8 (3 exotic), species 56 (10 exotic).

Wright: 459 (1912); Merxmüller: 1 (1969); Brandbyge: 531 (1993).

Classification of Polygonaceae (adapted from Mabberley 1997)

Subfamily POLYGONOIDEAE (ocrea present):

1. Tribe **Rumiceae** (Herbs; perianth (2)3+(2)3): *Rumex*, *Emex*
2. Tribe **Polygoneae** (Herbs or shrubs; perianth 5, outer often winged): **Fallopia*, *Oxygonum*, *Polygonum*, **Reynoutria*
3. Tribe **Persicarieae** (Herbs; perianth 5, outer rarely winged): **Fagopyrum*, *Persicaria*

Key to genera

1a Outer perianth segments bearing short sharp spines:
  2a Spines forming at the tip of the outer perianth segments; flowers unisexual; female flowers sessile in axillary clusters... **Emex**
  2b Spines forming at base of the outer perianth segments; flowers bisexual, in fascicles forming a lax raceme ..... **Oxygonum**
1b Outer perianth segments without spines:
  3a Perianth segments usually 6; inner 3 segments accrescent with entire, dentate or wavy margins ..... **Rumex**
  3b Perianth segments 4 or 5, not accrescent:
    4a Soft annual herbs with hollow stems; nut at least twice as long as the perianth ..... ***Fagopyrum**
    4b Coarse herbs, climbers or rhizomatous perennials; nut included in the perianth or protruding for less than half its length:
      5a Perianth constricted above ovary and persistent at apex of fruit; heterostylous..... **Oxygonum**
      5b Perianth not constricted above ovary, enclosing fruit; not heterostylous:
        6a Outer perianth segments not winged or keeled in fruit; leaves distinctly longer than wide, rarely cordate:
          7a Ocrea silvery hyaline, lacerating ..... **Polygonum**
          7b Ocrea brown, membranous, truncate, fringed with cilia or bristles or entire..... **Persicaria**
        6b Outer perianth segments winged or keeled in fruit; leaves conspicuously cordate:
          8a Twining annuals; stigmas capitate, subsessile ..... ***Fallopia**
          8b Erect, rhizomatous perennials; stigmas fimbriate, styles fairly long ..... ***Reynoutria**

Emex Campd. 2194000

Campderá: 56 (1819); Wright: 481 (1912); Graham: 3 (1958); Tutin: 89 (1964); Brandbyge: 541 (1993).

Annual, erect, ascending or prostrate, rigid herbs, monoecious. **Leaves** petiolate, ovate to ovate-oblong; ocrea not ciliate, soon lacerating or falling off. **Flowers** unisexual, small, in axillary fascicles, or by abortion of upper leaves, appearing racemose. **Male flowers** pedicellate; perianth segments 5 or 6, free nearly to base, equal, spreading; stamens 4–6; filaments filiform; anthers ovate. **Female flowers** sessile; perianth 6-lobed, enlarged and hardened in fruit; tube ovoid, 3- or 6-angled in fruit and ± transversely ribbed between angles; lobes in 2 series, outer 3 spiny in fruit and inner obtuse or aristate. **Ovary** included in perianth tube, 3-angled; styles 3, short; stigmas dilated, fimbriate. **Fruit** a triquetrous nut enclosed within persistent perianth tube. **Seed** subterete. $x = 10$.

Species 2, Mediterranean region and Australia; 1 in sthn Afr.: *Emex australis* Steinh., widespread.

*__Fagopyrum__ Mill. 2202000

Miller: [495] (1754); Webb: 81 (1964); Brandbyge: 542 (1993).

Twining or erect perennial or annual herbs with hollow stems. **Leaves** triangular-sagittate, cordate; ocrea short, truncate, entire. **Inflorescence** branched or flowers in axillary clusters. **Flowers** unisexual, heterostylous, male, in narrow, terminal and axillary, raceme-like panicles; pedicels equalling perianth, articulated above middle. **Perianth** campanulate, with 5 segments, not accrescent. **Stamens** 8, alternating with yellow nectaries on disc. **Ovary** 3-angled; styles 3, long and slender; stigmas capitate, small. **Fruit** a triquetrous nut, greatly exceeding perianth. $x = 8$ (polyploidy).

Species 8, in Europe and Asia, widely cultivated and **Fagopyrum esculentum* L. (Buckwheat) occasionally found as an escape in sthn Afr.

*__Fallopia__ Adans. 2201040

Adanson: 277 (1763); Haraldson: 76 (1978).

Bilderdykia Dumort.: 18 (1827); Webb: 80 (1964).

Procumbent or twining and climbing annual herbs. **Leaves** long-petiolate, deltate or ovate, acuminate at apex, sagittate at base with a broad basal sinus; ocrea brown, membranous, truncate, glabrous or shortly pubescent, sometimes glandular at base, readily tearing. **Inflorescence** paniculate or flowers in axillary clusters. **Flowers** long-stalked. **Perianth** (5)6-lobed or -partite, persistent; lobes or segments oblong, with inner 2(3) flat and outer 3 keeled or slightly winged. **Stamens** 8, arising near base of perianth. **Ovary** 3-angled with 3 styles; stigmas capitate or peltate. **Fruit** a trigonous nut, enclosed in persistent perianth. $x = 10, 11$ (high polyploidy).

Species ± 9, in temperate regions of northern hemisphere; **Fallopia convolvulus* (L.) Á.Löve (Black Knot), a cosmopolitan weed, has become naturalised in sthn Afr., widespread.

Oxygonum Burch. ex Campd. 2204000

Campderá: 18 (1819); Wright: 459 (1912); Graham: 145 (1957); Graham: 6 (1958); Brandbyge: 541 (1993).

Annual or perennial herbs, rarely shrubs, polygamous. **Leaves** narrowly linear to lanceolate to elliptic to ovate to rhomboid, often deeply divided, lobes even further divided; apex acute, sometimes ending in a stiff point; sagittate, cuneate or rounded at base, narrowing to a short petiole; glabrous, hirsute, tomentose, strigose, glandular-punctate on one or both surfaces, or covered with cup-shaped or elongated scales; ocrea stem-clasping, membranous, truncate, fringed with terminal rigid setae or without, or deeply lobed, sometimes with a green leaf-like limb. **Inflorescence** a solitary, terminal or axillary thyrse with fascicles of up to 4 flowers in axils of brown, cup-shaped bracts. **Flowers** bisexual or unisexual, heterostylous. **Perianth** 5-lobed and long-persistent in bisexual flowers; outer segments keeled at apex; tube constricted above ovary, glabrous or densely white-pilose. **Stamens** 8, arising on inner perianth; filaments with a ring of brown cilia ± an eighth from base; anthers usually bluish. **Ovary** 3-angled; styles 3, connate at base; stigmas capitate. **Fruit** a 3-angled nut, sometimes winged, or armed with small rudimentary teeth at base, sometimes longitudinally ridged, warted between ridges. $x = 13$ (1 report, polyploidy).

Species ± 32, mostly confined to Africa, except for two species, one of which is an endemic on Madagascar; 6 in sthn Afr., widespread but absent in Western Cape.

Persicaria (L.) Mill. 2201030

Miller: [1054] (1754); Haraldson: 70 (1978); Brandbyge: 542 (1993).

Annual or perennial herbs, erect, prostrate, decumbent, scandent or floating, often swollen at nodes. **Leaves** sessile, subsessile or petiolate, always distinctly longer than broad, varying from linear to lanceolate to elliptic to ovate; apex acute, obtuse or rounded; rounded or cuneate at base; glabrous, hirsute, hispid, tomentose, or glandular-punctate on one or both surfaces; margins often edged with hispid hairs; ocrea stem-clasping, tubular, entire or lobed or fringed terminally with bristles or cilia or ending in a herbaceous spreading limb, glabrous, hirsute or hispid. **Inflorescence** paniculate, spike-like or capitate. **Flowers** bisexual. **Perianth** 3–5-lobed or -partite in one whorl, persistent; lobes or segments equal or outer slightly larger. **Stamens** 5–8, arising near base of perianth; anthers with 2 thecae united by short connective. **Ovary** 3-angled with 3 styles, or lenticular with 2 styles; stigmas capitate, usually entire. **Fruit** a 3-angled or lenticular nut, dark brown or black, shiny or dull, enclosed in persistent perianth or slightly protruding from it for less than half its length. $x = 10, 11, 12$ (high polyploidy).

Species ± 150, cosmopolitan in temperate regions; 10 in sthn Afr., including some introductions; widespread.

Polygonum L. 2201000

Linnaeus: 359 (1753); Wright: 463 (1912); Graham: 11 (1958); Webb & Chater: 76 (1964); Brandbyge: 542 (1993).

Annual or perennial herbs or dwarf shrubs, erect, prostrate or decumbent, often swollen at nodes. **Leaves** articulated at base; ocrea stem-clasping, silvery hyaline, glabrous. **Inflorescence** lax and spike-like with axillary flowers in clusters or solitary. **Flowers** bisexual. **Perianth** (4)5-lobed or -partite, persistent; lobes or segments equal or outer slightly larger. **Stamens** usually 8, arising near base of perianth; anthers with 2 thecae united by short connective. **Ovary** 3-angled with 3 styles, or lenticular with 2 styles; stigmas capitate, usually entire. **Fruit** a 3-angled or lenticular nut, enclosed in persistent perianth. $x = 10, 11$ (8, 12) (aneuploids, high polyploidy).

Species ± 20, temperate regions of the northern hemisphere; 5 in sthn Afr., including some introductions; widespread.

*Reynoutria Houtt. 2201020

Houttuyn: 639 (1777); Webb: 81 (1964); Haraldson: 75 (1978); Brandbyge: 541 (1993).

Robust, dioecious perennial herbs with extensive subterranean rhizomes and stout, erect to ascending annual stems. **Leaves** petiolate, large, alternate, broadly ovate-triangular to ovate-oblong, acute or acuminate at apex, cordate or truncate at base, with a small sinus; ocrea rather simple, brown, membranous. **Inflorescence** branched; peduncles shortly hairy. **Flowers** long-stalked, unisexual, with rudiments of stamens in female flowers and of gynoecium in male flowers. **Perianth** of 5 segments, outer 3 keeled, eventually enlarged and winged. **Stamens** usually 8, included, sometimes exserted. **Ovary** 3-angled with 3 styles; stigmas fimbriate. **Fruit** a 3-angled nut, ovate in outline, brown. $x = 11$ (polyploidy).

Species ± 15, in temperate Asia; **Reynoutria sachalinensis* (F.Schmidt) Nakai occasionally found as an escape in sthn Afr.

Rumex L. 2195000

Linnacus: 333 (1753); Wright: 472 (1912); Rechinger: 3 (1954); Rechinger: 82 (1964); Rechinger: 75-122 (1984); Brandbyge: 541 (1993).

Perennial or annual herbs or occasionally shrubby. **Leaves** often cordate or hastate, basal leaves differing from those near inflorescence; ocrea membranous. **Inflorescence** a leafy or leafless, terminal thyrse. **Flowers** bisexual or unisexual, in whorls, with articulated pedicels, ebracteate. **Perianth**: segments usually 6, in 2 whorls of 3, the inner enlarged in fruit. **Stamens** 6, arising at base of perianth. **Ovary** 3-angled, enclosed within persistent perianth; styles 3 and spreading or reflexed; stigmas fimbriate or penicillate. **Achene** usually enclosed within the stiff, dry, persistent perianth parts. $x = 7, 10$ (5, 8, 9) (high polyploidy, B-chromosomes).

Species over 200, cosmopolitan, mainly in temperate regions; ± 18 in sthn Afr., including several introduced species; widespread.

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Portulacaceae

(Caryophyllidae— Caryophyllales)

Compiled by M. Jordaan

Annual, biennial or perennial herbs, sometimes with thickened, ± woody, short, basal stems, occasionally soft-wooded shrubs or undershrubs, rarely small trees, often with most parts rather succulent; rarely dioecious. **Leaves** opposite or alternate, simple, usually with entire margins, glabrous or with glandular, barbulate or simple hairs; stipules 0 or leaf axils with hairs, spines, bristles or scales, often interpreted as stipules. **Inflorescences** variously cymose and terminal, rarely raceme-like paniculate, or terminal heads of sessile flowers surrounded by an involucre of leaves, occasionally reduced to solitary axillary flowers. **Flowers** bisexual or occasionally unisexual, usually regular. **Sepals** 2(3), usually unequal, imbricate, deciduous or rarely persistent, free or occasionally adnate to base of ovary. **Petals** (2–4)5(–15), imbricate, free or sometimes connate near base, ephemeral, fugacious or persistent, sometimes accrescent. **Stamens** (3)4–many, often as many as petals, hypogynous, perigynous or sometimes epigynous, free from each other but sometimes adnate to petals at base, or sometimes epipetalous; anthers basifixed, opening through longitudinal slits, sometimes staminodal. **Ovary** superior, rarely half-inferior, with 2–5 carpels but 1 locule and basal or free-central placentation at maturity; ovules 1–many, often on long funicles; stigmas 2–5(–8), free or connate into a style. **Fruit** a capsule dehiscing through 3–5(–8) terminal valves or circumscissile, sometimes with epicarp and endocarp separating and sometimes with epicarp deciduous; sometimes a nut which may dehisce irregularly near base. **Seeds** sometimes arillate and aril sometimes enveloping seed, sometimes compressed and rarely winged, shiny or granulated, with or without appendages; testa usually hard and crustaceous; endosperm rudimentary; perisperm usually present and often abundant; embryo ± curved almost into a circle.

Genera ± 30, species ± 450, largely a southern hemisphere family (Africa, Madagascar, Asia, Australia, New Zealand) extending into North America but poorly represented in Eurasia; some species widespread weeds; sthn Afr.: genera 7 (1 exotic), species 46 (3 exotic).

Jussieu: 312 (1789); Candolle: 354 (1828); Fenzl: 946 (1839a); Bentham: 155 (1862); Pax: 51 (1889); Franz: 1 (1908); Pax & Hoffmann: 234 (1934); MacNeill: 725 (1974); Nyananyo: 237 (1990); Carolin: 544 (1993); Gilbert: 120 (1993).

Key to genera

1a Sepals adnate to base of ovary; ovary half-inferior; seed dispersal by circumscissile split ..... **Portulaca**

1b Sepals free; ovary superior; fruit indehiscent or splitting into valves:

2a Herbs or subshrubs; ovules many:

3a Leaves without axillary hairs or scales; stipules 0 or, if present, linear, caducous; fruit a capsule or thin-walled nut:
4a Leaves fleshy and nearly terete; sepals deciduous ..... **Talinum**
4b Leaves not fleshy, flattened; sepals persistent ..... ***Calandrinia**
3b Leaves with stipules, axillary hairs and/or scales; fruit a capsule usually with the pericarp differentiating into epicarp and endocarp, which often separate, and sometimes the epicarp is deciduous:
5a Green leaves exposed, if more than 2, then in a rosette; flowers usually 2 or more on an elongated scape..... ..... **Anacampseros**
5b Green leaves not or only slightly exposed, hidden beneath imbricate papery scales making the shoots appear white; flowers 1 or few at the stem tip on short pedicels ..... **Avonia**
2b Much-branched glabrous shrubs to small trees with waxy bark; leaves succulent; ovules solitary:
6a Flowers bisexual, fascicled, usually in groups on shortened, terminal, leafless branchlets ..... **Portulacaria**
6b Flowers unisexual, rarely bisexual, arranged in fascicles or axillary racemes..... **Ceraria**

Anacampseros L. 2412000

Linnaeus: 232 (1758) name conserved; Candolle: 355 (1828); Fenzl: 950 (1839a); Bentham: 157 (1862); Sonder: 382 (1862); Pax: 57 (1889); Pearson & Stephens: 30 (1912); Burtt Davy: 165 (1926); Poellnitz: 382 (1933a); Pax & Hoffmann: 253 (1934); McNeill: 727 (1974); Nyananyo: 239 (1990); Carolin: 551 (1993); Rowley: 105 (1994); Rowley: 30 (1995).

Anacampseros L. section *Anacampseros*, Court: 112 (1981); Gerbaulet: 535 (1992).

Dwarf, sparingly branched perennial herbs or undershrubs, often with tuberous rootstock; roots thick, fleshy, soft; stems short, thick, fleshy, soft. **Leaves** alternate, simple, entire, often closely packed, succulent, green leaves exposed, glabrous or papillate; if more than 2, then in a rosette; stipules, when present, modified into bristly hairs. **Inflorescences** terminal, erect on an elongated, 2–more-flowered scape, with few slender branches and scattered, bract-like, reduced leaves, or undeveloped. **Flowers** bisexual, sessile, opening for a few hours in bright sunlight. **Sepals** 2, soon deciduous. **Petals** 5, hypogynous, fugaceous, white, pink or red. **Stamens** many, adhering to base of petals; filaments usually white; anthers yellow. **Ovary** superior, 1-locular, sessile; ovules many on a free-central placenta; style 3-fid. **Fruit** a capsule, 3-valved or falsely 6-valved by subdivision; epicarp separating from endocarp and deciduous with bristle between each valve. **Seeds** with a large empty-celled outer layer, angled or compressed, sometimes 3-winged; embryo slightly curved but not surrounding the small perisperm. $x = 9$ (polyploidy).

Species 14 and some subspecies, restricted to sthn Afr.; mainly in arid and semi-arid areas, Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Free State, KwaZulu-Natal, Northern, Western and Eastern Cape.

Anacampseros and *Avonia* belong to the tribe Anacampseroteae Nyananyo ex Rowley

Avonia (E.Mey. ex Fenzl) Rowley 2412010

Rowley: 105 (1994); Steffens: 12 (1995); Rowley: 49 (1995).

Anacampseros L. subgenus *Avonia* E.Mey. ex Fenzl: 295 (1839b). *Anacampseros* L. section *Avonia* (E.Mey. ex Fenzl) Gerbaulet: 543 (1992); Rodgerson: 2 (1994).

Dwarf herbaceous perennials; aerial stems succulent, with closely packed leaves obscuring internodes; roots mostly thick, woody or caudiciform with simple or branching stems. **Leaves** alternate, often minute, less than twice as wide as thick; green leaves not or only slightly exposed, hidden beneath imbricate papery, often scarious scales, making shoots appear white. **Inflorescences** terminal. **Flowers** 1 or few at stem tips, surrounded by scaly bracts, on short pedicels, opening for a very short time only, sometimes cleistogamous, white or rarely pink or carmine. **Sepals** 2, shortly connate at base, subpersistent. **Petals** 5, free. **Stamens** 5–many, adnate to petals at base; filaments white; anthers yellow. **Ovary** superior; ovules many; style thread-like; stigma entire or 3-lobed. **Fruit** an elongated 3- or 4-valved capsule. **Seeds** many, winged or with minute blunt protuberances.

Species 11, Somalia, Zimbabwe; 10 in sthn Afr., highest concentration of species in Namibia and Northern Cape, but extends also to Botswana, Northern Province, Free State, Western and Eastern Cape.

***Calandrinia** Kunth 2407000

Kunth: 77 (1823) name conserved; Fenzl: 951 (1839a); Fenzl: 295 (1839b); Bentham: 158 (1862); Pax: 56 (1889); McNeill: 727 (1974); Carolin: 383 (1987); Nyananyo: 239 (1990); Carolin: 552 (1993); Eliasson: 32 (1996).

Annual or perennial herbs with a basal leaf rosette, rarely with tuberous taproots, with unicellular trichomes; stems low and spreading to erect, simple to branched from base. **Leaves** linear to oblanceolate, alternate, usually coarsely but sparsely ciliate, otherwise glabrous; stipules 0. **Flowers** bisexual, solitary in axils of basal leaves or in monochasia resembling racemes with a single but ± lateral, herbaceous bract narrowing towards base at each flower. **Sepals** 2, often unequal, persistent, herbaceous. **Petals** 3–7, equalling sepals, usually deep crimson-purple to (rarely) white. **Stamens** (3–)5–15, shorter than petals. **Ovary** superior, usually 2- or 3-valved from top; styles 3 or 4, usually free. **Fruit** mostly a 3-valved, membranous capsule, with valves often very involute and spreading. **Seeds** 15–many, reniform-ovoid, shiny black; embryo encircling perisperm. $x = 8$ (10, 11, 23) (polyploidy).

Calandrinia in strict sense: 12–15 species, North and South America; 1 introduced in sthn Afr.: **Calandrinia ciliata* (Ruiz & Pav.) DC., Western Cape.

Ceraria H.Pearson & Stephens 2419010

Pearson & Stephens: 32 (1912); Pax & Hoffmann: 260 (1934); Podlech: 7 (1967); McNeill: 726 (1974); Nyananyo: 238 (1990); Carolin: 550 (1993).

Shrublets, shrubs, or small trees, with stout waxy branches; plants dioecious. **Leaves** in pairs or fascicled, small, few, succulent, flat or terete. **Inflorescences** cymose clusters, fascicles or axillary racemes. **Flowers** unisexual or only rarely bisexual. **Sepals** 2, short, persistent. **Petals** 5, free, longer than sepals, hypogynous, at length accrescent. **Stamens** 5, usually with aborted anthers in female flowers. **Ovary** 3-angled, slightly flattened; ovule solitary, basal, rudimentary in male flowers; style short or 0; stigma 2- or 3-fid. **Fruit** a nut, compressed, asymmetrical, membranous, tightly enclosed in base of accrescent corolla, at first single-winged, but later becoming fleshy and wingless. $x = 8$ (high polyploidy).

Species 6 in Africa; 3 in sthn Afr., Namibia and Northern Cape.

Portulaca L. 2421000

Linnaeus: 445 (1753); Linnaeus: 204 (1754); Adanson: 242 (1763); Jussieu: 312 (1789); Kunth: 71 (1823); Candolle: 353 (1828); Bentham: 156 (1862); Sonder: 381 (1862); Oliver: 148 (1868); Pax: 59 (1889); Franz: 17 (1908); Burtt Davy: 165 (1926); Poellnitz: 240 (1934a); Pax & Hoffmann: 246 (1934); Wild: 364 (1961); Walters: 114 (1964); Geesink: 275 (1969); Wild & Diniz: 1 (1973); McNeill: 726 (1974); Nyananyo: 399 (1987); Carolin: 550 (1993); Eliasson: 40 (1996).

Succulent annual or perennial herbs, mostly with tuberous roots; stems prostrate to ascending or erect. **Leaves** alternate or subopposite, flat or terete, mostly with axillary hairs and rarely with axillary scales; stipules scarious or reduced to fascicles of setae. **Inflorescences** terminal cymose heads, often surrounded by an involucre, or flowers solitary or in groups of 2. **Flowers** bisexual, sessile. **Sepals** 2, often connate at base, imbricate, the anterior larger and overlapping the posterior, deciduous. **Petals** (4)5(6), free or connate below, deliquescent, perigynous. **Stamens** (4)5–many, arising at base of petals; filaments often hairy below. **Ovary** half-inferior; ovules many on free-central placenta; style 2–9-fid. **Fruit** a capsule, membranous, circumscissile at the hypanthium. **Seeds** many, laterally compressed, reniform, shiny, often granulated; embryo peripheral. $x = 9$ (4, 5, 7, 8) (polyploidy).

Species ± 40 (Geesink 1969), cosmopolitan but mostly in warmer climates; 8 indigenous in sthn Afr., mainly in arid areas, in all countries and provinces, except Western Cape; 1 species: **Portulaca oleracea* L., is a very widespread weed of roadsides and cultivated waste lands.

Portulacaria Jacq. 2419000

Jacquin: 160, t. 122 (1787); Candolle: 360 (1828); Fenzl: 950 (1839a); Fenzl: 294 (1839b); Bentham: 157 (1862); Sonder: 385 (1862); Pax: 59 (1889); Burtt Davy: 164 (1926); Pax & Hoffmann: 260 (1934); McNeill: 726 (1974); Nyananyo: 235 (1989); Nyananyo: 238 (1990); Carolin: 550 (1993).

Succulent, glabrous shrubs with stout, sometimes waxy branches. **Leaves** opposite, succulent. **Flowers** fascicled on terminal branchlets. **Sepals** 2, membranous, becoming somewhat rigid, persistent. **Petals** connate into a short tube with 4 or 5 obovate lobes. **Stamens** 4–7, adnate to petals; anthers often aborted. **Ovary** superior, 3-angled or narrowly 3-winged, 1-locular; ovule solitary, basal; style short; stigmas 3, slightly spreading. **Fruit** a thin-walled, 3-winged nut, indehiscent. $x = 11$ (1 report, polyploidy).

Species 3, confined to sthn Afr., Namibia, Northern Province, Mpumalanga, Swaziland, N KwaZulu-Natal, Northern and Eastern Cape, in xerophytic scrub.

Talinum Adans. 2406000

Adanson: 245 (1763); Jussieu: 312 (1789); Kunth: 75 (1823); Candolle: 356 (1828); Fenzl: 950 (1839a); Bentham: 157 (1862); Sonder: 385 (1862); Oliver: 149 (1868); Pax: 56 (1889); Burtt Davy: 166 (1926); Poellnitz: 112 (1933b); Poellnitz: 1 (1934b); Pax & Hoffmann: 248 (1934); Wild: 369 (1961); Tölken: 19 (1969); Wild & Diniz: 7 (1973); McNeill: 727 (1974); Nyananyo: 239 (1990); Carolin: 552 (1993); Eliasson: 49 (1996).

Shrubs or undershrubs with annual branches from a perennial base, often with fleshy tuberous roots. **Leaves** alternate, rarely subopposite or rosulate, succulent, terete, subterete or flat, linear to broadly elliptic, obovate, petiolate; stipules linear, setaceous, usually keeled, with membranous margin, usually caducous. **Inflorescences** terminal or axillary cymes, racemes, panicles, or rarely flowers solitary. **Flowers** bisexual. **Sepals** 2, narrowly ovate to broadly ovate, herbaceous, keeled, slightly hooded at apex, green, usually with membranous margin, deciduous or rarely subpersistent. **Petals** (4)5(–7), ovate, often faintly keeled at apex, free or connate at base, ephemeral. **Stamens** 10–30(–50), attached to base of petals, hypogynous; filaments usually connate at base. **Ovary** superior, 1-locular with 3 carpels; ovules 10–40, on free-central placenta; style cylindrical or 0, with 3 stigmatic lobes. **Fruit** a chartaceous capsule, 1-locular, many-seeded, ovoid to conical, shiny yellow, dehiscing by 3(6) ± deciduous valves. **Seeds** reniform or lenticular, dark brown, black or greyish and laterally compressed or nearly globular, smooth or tuberculate, pitted or ridged, with distinct hilum, with a small aril near base; embryo annular. $x = 12$ (polyploidy).

Species ± 40, widespread in Africa, North and South America. Section *Talinum* with ± 14 species in North and South America and in Africa, with 5 indigenous in sthn Afr., in summer-rainfall areas: Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal and Northern Cape; **Talinum paniculatum* (Jacq.) Gaertn. from North America has been recorded as a garden escape in Gauteng, Swaziland, KwaZulu-Natal and Eastern Cape.

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Primulaceae

(Dilleniidae—Primulales)

Compiled by H.F. Glen

Herbs, annual or perennial, occasionally becoming slightly woody. **Leaves** alternate, opposite, sometimes whorled or 3-nate, simple, entire; stipules 0. **Flowers** regular, bisexual, often heterostylous, in racemes or solitary and axillary. **Calyx** 5-fid or -partite, rarely 4–7-lobed, free or ± adnate to ovary below. **Corolla** rotate or subcampanulate, 4- or 5-fid or -partite or hypocrateriform, with a spreading, 5(rarely 4–7)-partite limb. **Stamens** as many as corolla lobes, arising from tube opposite lobes or from lobes, sometimes with alternating staminodes. **Ovary** superior (except in *Samolus*), 1-locular, with a free, central placenta and few to many ovules; style 1, distyly occurs sometimes. **Fruit** a capsule. **Seeds** usually angular and sometimes with narrow wings.

Genera 20–22, species ± 800–1 000, mostly in temperate regions of northern hemisphere; sthn Afr.: genera 3, species 8.

Harvey & Wright: 426 (1906); Dyer: 9 (1963); Friedrich-Holzhammer: 1 (1967); Guillaumet: 1 (1981); Peltier: 3 (1981); Kupicha: 184 (1983).

Key to genera

1a Staminodes present; ovary half-inferior ..... **Samolus**
1b Staminodes usually absent; ovary superior:
2a Inflorescence a raceme or panicle; filaments glabrous ..... **Lysimachia**
2b Inflorescence reduced to solitary, axillary flowers; filaments bearded ..... **Anagallis**

Anagallis L. 6338000

Linnaeus: 148 (1753); Pax & Knuth: 321 (1905); Harvey & Wright: 428 (1906); Taylor: 321 (1956); Taylor: 133 (1958); Dyer: 13 (1963); Guillaumet: 1 (1981); Peltier: 5 (1981); Kupicha: 189 (1983).

Herbs, creeping or erect. **Leaves** opposite or alternate, rarely 3-nate, sessile or shortly petioled. **Flowers** usually axillary and solitary on slender pedicels, rarely in a lax raceme. **Calyx** 5-partite; segments lanceolate or subulate, spreading. **Corolla** 5-partite; segments obovate or linear. **Stamens** arising at base of corolla and shorter than it; filaments usually bearded. **Ovary** superior, globose; style simple. **Capsule** enclosed in persistent calyx and with persistent style, circumscissile or indehiscent. **Seeds** ellipsoid, 3-angled or 3-winged or with a circular wing forming a concave face and deeply keeled on other side. $x = 10, 11$ (7) (high polyploidy).

Species 20–30, fairly cosmopolitan, mostly under relatively moist conditions; 4 in sthn Afr., Swaziland, Lesotho, all provinces of South Africa except Northern Cape.

Lysimachia L. 6330000

Linnaeus: 146 (1753); Pax & Knuth: 256 (1905); Harvey & Wright: 427 (1906); Dyer: 11 (1963); Guillaumet: 1 (1981); Peltier: 4 (1981); Kupicha: 187 (1983).

Herbs, mostly perennial. **Leaves** alternate, opposite or whorled. **Flowers** usually in spicate racemes, sometimes in panicles, dirty white, dark red or purple. **Calyx** divided almost to base; segments 5 or 6, oblong. **Corolla** usually longer than calyx; tube subcylindric or campanulate; lobes longer than tube. **Stamens** arising from corolla tube, included or exserted; filaments glabrous; staminodes rarely present. **Ovary** superior, globose or ovoid; style cylindric, ± as long as corolla; stigma minutely 3-lobed. **Capsule** surrounded by persistent calyx and with persistent style, opening by 5 valves at apex, rarely irregularly dehiscent. **Seed** brown, 3-angled. $x = 12$ (8, 9, 10, 14, 17) (high polyploidy, B-chromosomes).

Species 150–200, chiefly in Europe, Asia and North America; 2 in sthn Afr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Samolus L. 6328000

Linnaeus: 171 (1753); Pax & Knuth: 336 (1905); Harvey & Wright: 430 (1906); Dyer: 10 (1963); Peltier: 13 (1981); Kupicha: 196 (1983).

Herbs with soft or wiry flowering branches. **Leaves** somewhat rosulate and petiolate in early growth, often dying when flowering stem is produced, alternate on flowering stems, either soft or somewhat rigid and scabrid. **Flowers** in racemes or panicles. **Calyx** 5-fid, persistent. **Corolla** deciduous; limb 5-partite, with 5 narrow scales (staminodes) arising from mouth of tube and alternating with corolla lobes and stamens. **Stamens** 5, arising from corolla tube; anthers basifixed. **Ovary** half-inferior, many-seeded; style filiform. **Capsule** opening above by 5 valves. $x = 13$ (12) (high polyploidy).

Species ± 15, cosmopolitan, mostly in saline marshes, 2 in sthn Afr., Namibia, Botswana, all provinces of South Africa except Free State.

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Proteaceae

(Rosidae—Proteales)

Compiled by J.P. Rourke

Trees or shrubs, sometimes prostrate, sometimes dioecious. **Leaves** alternate, subopposite or in whorls, simple and entire, variously lobed or pinnatisect, often dimorphic, the apices occasionally bearing teeth; stipules 0. **Inflorescence** a panicle, raceme, spike or capitulum; capitula often involucrate. **Flowers** bisexual or unisexual, if unisexual, then plants usually dioecious; regular to irregular. **Perianth** of 4 valvate segments, differentiated into a claw and limb, often fused at base to form a tube. **Stamens** 4, opposite perianth segments and usually arising at base of perianth limbs, occasionally with free filaments arising from torus; anthers 2-locular, introrse, dehiscing longitudinally, connective produced into a dark, apical boss. **Ovary** superior, sessile or stipitate, unilocular with one (in most sthn Afr. genera) or more ovules; style simple, terete, modified to form a stigma and terminal pollen presenter; pollen presenter terminal, straight or oblique, filiform, cylindric, linear, ovoid, or discoid. **Hypogynous scales** 4, alternating with perianth segments, or as an annular, lobed disc, or occasionally 0. **Fruit** an indehiscent achene, or drupe, occasionally winged, or a woody, dehiscent follicle with several seeds. **Seeds** sometimes winged, usually endospermous.

Genera ± 75, species ± 1 350, mostly Africa, Madagascar, southeast Asia, the Malaysian Region, Pacific Islands, Australasia and South America; sthn Afr.: genera 16 (2 exotic), species ± 360.

Stapf *et al.*: 502 (1912); Johnson & Briggs: 83 (1975).

The Proteaceae is currently divided into seven subfamilies (Douglas 1995): the Persoonioideae, Bellendenoideae, Ediotheoideae, Proteoideae, Sphalmioideae, Carnavonioideae and Grevilleoideae of which only the Proteoideae and Grevilleoideae are represented in sthn Afr.

Classification of Proteaceae

I. Subfamily GREVILLEOIDEAE
(Floral bract subtending a pair of flowers; ovary with two ovules): *Brabejum*, **Grevillea*, **Hakea*

II. Subfamily PROTEOIDEAE
(Floral bract subtending a single flower; ovary with a single ovule): *Aulax*, *Diastella*, *Faurea*, *Leucadendron*, *Leucospermum*, *Mimetes*, *Orothamnus*, *Paranomus*, *Protea*, *Serruria*, *Sorocephalus*, *Spatalla*, *Vexatorella*

Key to genera

1a Flowers paired in axil of a bract; ovules 2:
2a Leaves in whorls ..... **Brabejum**
2b Leaves alternate:
3a Leaves usually terete; if flattened, then both surfaces similar; mature follicles hard and woody ..... ***Hakea**
3b Leaves pinnately or bipinnately divided, upper and lower surfaces different; follicles thin to coriaceous ..... ***Grevillea**
1b Flowers solitary in axil of a bract; ovule 1:
4a Flowers unisexual:
5a Female flowers in cones formed by woody, imbricate bracts; male flowers sessile in densely congested, globose or conic inflorescences, rarely spicate ..... **Leucadendron**
5b Female flowers in densely involucrate, foliaceous heads, arranged racemosely on a central cone of tissue; male flowers in lax racemes, pedicellate ..... **Aulax**
4b Flowers bisexual:
6a Leaves pinnately or bipinnately divided, or at least divided at some stage; leaflets usually terete or subterete:
7a Inflorescence globose or cylindric; flowers arranged in sessile groups of 4, each flower subtended by a floral bract that becomes woody in the post-pollination phase ..... **Paranomus**
7b Inflorescence a panicle, a capitulum or a panicle of capitula; floral bracts not enlarging in post-pollination phase .... **Serruria**
6b Leaves entire, or with apical teeth:
8a Inflorescence a panicle, raceme or lax spike:
9a Broad-leaved trees; inflorescence a lax terminal spike ..... **Faurea**
9b Terete-leaved shrubs; inflorescence a panicle, raceme or condensed raceme:
10a Inflorescence a panicle; flowers regular, straight in bud ..... **Sorocephalus**
10b Inflorescence a raceme or condensed raceme; flowers irregular or at least abaxially curved in bud ..... **Spatalla**
8b Inflorescence a 3–many-flowered capitulum; capitula terminal and solitary, or axillary and often many towards apex of a flowering shoot, or a terminal panicle of capitula:
11a Capitula solitary and terminal or a terminal panicle of capitula:
12a Capitula surrounded by large, highly coloured, involucral bracts; perianth separated to base into two parts, an adaxial sheath of 3 fused perianth segments and a free abaxial perianth segment ..... **Protea**
12b Capitula surrounded by small, insignificant, green, white or pink involucral bracts; perianth fused into a distinct tube at base:

13a Leaves terete, acicular:
14a Perianth limbs glabrous ..... **Diastella**
14b Perianth limbs pubescent ..... **Sorocephalus**
13b Leaves flat:
15a Perianth segments free to base, perianth tube 0; hypogynous scales usually 0 ..... **Diastella**
15b Perianth segments fused to form a distinct tube 3–8 mm long; hypogynous scales present ..... **Vexatorella**
11b Capitula axillary:
16a Involucral bracts large, conspicuous, usually brightly coloured, but occasionally brown:
17a Perianth separating to base into 2 parts, an adaxial sheath of 3 fused perianth segments and a free, abaxial segment ..... **Protea**
17b Perianth fused into a tube at base:
18a Capitula sessile ..... **Mimetes**
18b Capitula pedunculate ..... **Orothamnus**
16b Involucral bracts small, green or brown, cartilaginous, papyraceous or woody, not brightly coloured:
19a Capitula usually pedunculate or narrowed to a peduncular region, globose or ovoid with more than 15 flowers per capitulum ..... **Leucospermum**
19b Capitula sessile, massed among upper leaves on shoot and partly hidden by them, with 3–15 flowers per capitulum ..... **Mimetes**

Aulax P.J.Bergius 2038000

(Proteoideae)

Bergius: 33 (1767); Stapf *et al.*: 505 (1912); Venkata Rao: 239 (1969); Rourke: 464 (1987).

Shrubs, erect, glabrous, dioecious. **Leaves** alternate, entire, glabrous, acicular to linear-spatulate. **Flowers** arranged racemosely on a central column, enclosed by incurved, much reduced fascicles of side branches, occasionally bearing flowers; the whole forming a globose head. **Male inflorescence** a lax, terminal, spike-like raceme. **Female inflorescence** a dense, involucrate foliaceous head. **Male flowers**: perianth glabrous, tubular, straight; segments free to base; claws and limbs merging imperceptibly, linear-acute; anthers subsessile; filaments arising from base of perianth; style straight, terete, thickened towards apex; hypogynous scales 0. **Female flowers**: ovary ovoid, densely pubescent, with 1 ovule; style terete, slightly curved, pubescent proximally, terminating in an oblique, stigmatic disc; perianth glabrous, widened proximally, tapering distally; limbs linear-lanceolate, recurved at anthesis; staminodes filiform-linear. **Fruit** an obovoid to somewhat compressed, pubescent achene, truncate, with long, dense, white cilia on the median ridge. $x = 11$.

Species 3, Western Cape.

Brabejum L. 2024000

(Grevilleoideae)

Linnaeus: 121 (1753); Stapf *et al.*: 504 (1912); Jordaan: 15 (1946); Rourke: 53 (1971).

Brabyla L.: 137 (1767). *Brabejaria* Burm.f.: 26 (1768).

Shrubs or trees. **Leaves** in whorls of 5–7, petiolate; margins coarsely serrate. **Flowers** bisexual, regular, 4–5 mm long, glabrous, pedicellate, arranged in spike-like, axillary racemes, borne in pairs in axils of ovate, caducous, pubescent bracts. **Perianth** straight, cylindric in bud; segments free to base; limbs ovate. **Stamens** slightly shorter than perianth segments; filaments linear, flattened, free from base of perianth segments; anthers oval, with dark, rounded, apical boss. **Ovary** ovoid, sericeous, with 2 pendulous ovules; style straight, terete, apex acute. **Hypogynous disc** annular. **Fruit** a woody, indehiscent, almond-shaped drupe, densely ferruginous-velutinous. $x = 14$ (can be 7) (1 report).

Species 1: *Brabejum stellatifolium* L., Western Cape: Cederberg to Riversdale.

Diastella Salisb. ex Knight 2031020

(Proteoideae)

Knight: 61 (1809); Stapf *et al.*: 650 (1912); Rourke: 185 (1976).

Undershrubs, erect, sprawling, or decumbent. **Leaves** alternate, imbricate, oblong, ovate, orbicular, or acicular-terete, usually entire, rarely with apical teeth. **Inflorescence** a solitary, sessile, globose capitulum (very rarely several axillary capitula); involucral bracts equalling or exceeding length of perianth, 1–3-seriate, ovate-lanceolate, acute to acuminate, papyraceous. **Flowers** bisexual, regular. **Perianth** cylindric, straight in bud; tube very short; claws filiform, sericeous; limbs filiform to linear-lanceolate, acute to acuminate, glabrous or sericeous. **Anthers** linear, acute, arising from base of perianth limb. **Ovary** ovoid, pubescent with 1 ovule; style terete, filiform, glabrous or proximally pubescent, curved before anthesis becoming straight later; pollen presenter cylindric, filiform. **Hypogynous scales** usually 0. **Fruit** an ovoid to cylindric achene, introrse at base, glabrous to puberulous.

Species 7, Western Cape.

Faurea Harv. 2034000

(Proteoideae)

Harvey: 6: 375, t.15 (1847); Welwitsch: 62 (1869); Stapf *et al.*: 639 (1912); Kotze & Phillips: 232 (1919); Bosser & Rabevohitra: 58 (1991); Marner in Brummitt & Marner: 2 (1993).

Trees or shrubs. **Leaves** alternate, entire, petiolate, obovate, ovate, lanceolate or elliptic, occasionally falcate, usually glabrous, occasionally pubescent on lower surface; midrib prominent. **Inflorescence** a lax, terminal spike. **Flowers** bisexual, slightly irregular, each subtended by an ovate floral bract, sessile or pedicellate. **Perianth** puberulous or tomentose with cream to rusty hairs, tubular, adaxially curved in bud, split abaxially by the emerging style; 3 adaxial segments fused into a sheath; abaxial segment separating to the short tube; limbs lanceolate-elliptic. **Anthers** linear-elliptic, sessile to subsessile, arising at base of perianth limbs. **Ovary** ovoid, covered with long, straight trichomes, with 1 ovule; style terete, adaxially curved, persistent; pollen presenter filiform, cylindric to cylindric-clavate, slightly geniculate at base. **Hypogynous scales** 4, lanceolate, acute, prominent. **Fruit** a globose achene with prominent basal attachment scar, covered in long, straight white hairs.

Species ± 15, Africa and Madagascar; 4 in sthn Afr., Northern Province to KwaZulu-Natal and Western Cape.

*Grevillea R.Br. ex Knight 2045000

(Grevilleoideae)

Knight: 120 (1809); Bentham: 417 (1870); Mc Gillivray & Makinson: 1 (1993).

Erect to prostrate shrubs, occasionally trees to 30 m. **Leaves** alternate, rarely subopposite, variously pinnatifid with up to 3 orders of division, dorsiventral, upper and lower surfaces usually different. **Inflorescences** 1–many-flowered, terminal, axillary or cauline. **Flowers** bisexual, irregular, pedicellate in pairs subtended by a single bract. **Perianth**: limbs forming a distinct knob at bud apex. **Receptacle** transverse or oblique to the pedicel. **Hypogynous disc** formed into a horseshoe-shaped nectary. **Ovary** stipitate or sessile. **Pollen presenter** discoid to conical, oblique or lateral. **Fruit** a membranous to coriaceous follicle, 1- or 2-seeded. **Seeds** winged.

Species ± 260, Australia, New Guinea, New Caledonia, Indonesia. **Grevillea robusta* and **G. banksii* are naturalised, mainly in KwaZulu-Natal.

*Hakea Schrad. 2047000

(Grevilleoideae)

Schrader: 27, t. 17 (1798); Bentham: 489 (1870); Henderson & Anderson: 74 (1966); Rebelo: 206 (1995).

Shrubs or small trees. **Leaves** alternate, very coriaceous, entire or pinnately divided, occasionally dimorphic, acicular-terete to broadly ovate, often spine-tipped or bearing marginal spines. **Inflorescence** a sessile raceme, or fascicles of flowers in axils of leaves, rarely terminal. **Flowers** bisexual, usually irregular, pedicellate, borne in pairs in the axil of a single bract. **Perianth** curved strongly, with claws separating to base at anthesis; limbs elliptic-ovate. **Anthers** sessile, arising from base of perianth limbs. **Ovary** ovoid, often oblique, stipitate, with 2 ovules; style terete, straight or curved; pollen presenter oblique, conic to ovoid or discoid. **Hypogynous disc** oblique, semi-annular. **Fruit** a hard, woody follicle, opening into 2 valves. **Seeds** (1)2, compressed, winged. $x = 10$.

An Australian genus of ± 110 species several of which are cultivated as ornamentals and at least 3 are naturalised in sthn Afr. as weeds mainly in the Western Cape and KwaZulu-Natal.

Leucadendron R.Br. 2037000

(Proteoideae)

Brown: 56 (1810); Stapf *et al.*: 509 (1912); Williams: 1 (1972); Williams: 121 (1981); Van Wyk: 458 (1990).

Trees or shrubs, erect or decumbent, dioecious. **Leaves** alternate, entire, sessile to subpetiolate, acicular to oval, obovate or spatulate, glabrous to densely sericeous. **Flowers** regular to very slightly irregular. **Male flowers** in solitary, terminal, globose to cylindric capitula, rarely spikes, each capitulum sessile or pedunculate, with a small involucre of brown, papyraceous bracts at base; perianth cylindric, straight or slightly curved in bud, pubescent or glabrous, limbs linear-elliptic, merging imperceptibly into the linear claws, becoming recurved at anthesis; tube very short; anthers sessile to subsessile, linear, acute; style straight or curved, filiform, glabrous or pubescent proximally; pollen presenter cylindric, clavate or truncate, frequently cleft at apex; hypogynous scales 4, filiform-subulate, rarely 0. **Female flowers** in solitary, terminal capitula, each flower subtended by a floral bract which enlarges greatly and becomes woody after anthesis; mature capitulum a woody, conic, ovoid, or globose cone; perianth as in male, but transversely compressed; staminodes linear, sessile or subsessile; style filiform, glabrous, straight or curved, swollen at apex to form a terminal or oblique, often cleft, stigmatic disc; ovary ovoid, pubescent or glabrous; ovule 1; hypogynous scales as in male. **Fruit** an ovoid to biconvex achene, or a samara, ventricose, trigonal, or compressed, pubescent or glabrous. $x = 13$.

Species 83, mainly Western Cape, Eastern Cape with outliers in KwaZulu-Natal.

Leucospermum R.Br. 2036000

(Proteoideae)

Brown: 95 (1810); Stapf *et al.*: 610 (1912); Rourke: 1 (1972).

Shrubs or small trees, erect, decumbent, or sprawling. **Leaves** alternate, loosely ascending or imbricate, sessile or petiolate, linear to oval, oblanceolate, obovate or spatulate, entire or with up to 17 teeth at apex, glabrous or pubescent with a short indumentum of fine, crisped hairs. **Inflorescence** a capitulum, axillary, solitary or in groups of up to 10 per flowering shoot, sessile or pedunculate; involucral bracts small, green, cartilaginous or papyraceous. **Receptacle** cylindric, conic, globose or flat. **Flowers** bisexual, regular or irregular. **Perianth** cylindric in bud, straight or adaxially curved, pubescent, fused at base into short tube; tube cylindric or narrow proximally and inflated distally; three adaxial claws fused to form a sheath; abaxial claw separating from others; limbs lanceolate to ovate, acute. **Anthers** sessile or subsessile, arising from base of perianth limbs, ovoid-ellipsoid. **Ovary** slender, puberulous, with 1 ovule; style straight or adaxially arcuate, tapering; pollen presenter cylindric, clavate, ovoid, conic, or obliquely turbinate. **Hypogynous scales** 4, linear to deltoid-subulate. **Fruit** an ovoid to cylindric achene, introrse at base, glabrous or minutely puberulous. $x = 12$.

Species 48, mainly southwestern and southern region of Western Cape, extending to Eastern Cape, KwaZulu-Natal and Zimbabwe.

Mimetes Salisb. 2031000

(Proteoideae)

Salisbury: t. 66 (1807); Stapf *et al.*: 643 (1912); Rourke & Lincoln: 1 (1982); Rourke: 171 (1984a); Rourke: 636 (1988).

Shrubs or small trees. **Leaves** alternate, imbricate, oblong, oblong-elliptic, oval, or rhombic, entire, with a thickened apical callus or several apical teeth, pubescent or silvery-sericeous. **Inflorescence** an aggregation of sessile, axillary capitula; capitula 3–16-flowered, surrounded by an involucre of small, oblong to lanceolate bracts; bracts woody or much enlarged, brightly coloured, fleshy to papyraceous. **Flowers** bisexual, regular. **Perianth** cylindric in bud; tube very short, cylindric or bulbous, usually glabrescent; claws filiform, pubescent; limbs linear, acute, glabrescent or pubescent. **Anthers** linear, acute, arising from base of perianth limb. **Ovary** slender, pubescent, with 1 ovule; style terete, curved while elongating, but straight after anthesis; pollen presenter linear, acute to acuminate, or with a cylindric, ovoid-capitate or conic-capitate apex, usually geniculate or annulate at junction with style. **Hypogynous scales** 4, obtuse or linear-filiform. **Fruit** an ovoid or cylindric achene, broadly or narrowly introrse at base, glabrous to minutely puberulous. $x = 12$ (1 report).

Species 13, Western Cape: Porterville to the Kouga Mountains.

Orothamnus Pappe ex Hook. 2031010

(Proteoideae)

Hooker: t. 4357 (1848); Stapf *et al.*: 650 (1912); Rourke & Lincoln: 147 (1982).

Shrubs, erect, very sparsely branched. **Leaves** alternate, imbricate, sessile, rhombic-obovate, glabrescent, mar-

gins thickly fimbriate. **Inflorescence** a capitulum, axillary, pedunculate, 1–5 towards apex of branches, bracteate; bracts obovate, in several whorls, outermost greenish and shaggy, innermost scarlet, carnose and glabrous, but puberulous proximally on abaxial surface; involucral receptacle flat. **Flowers** bisexual, regular. **Perianth** cylindric, straight in bud; tube a quarter the length of perianth, pubescent distally, glabrous proximally; claws filiform, villous; limbs linear, acute, glabrescent. **Anthers** linear, acute, arising from base of perianth limbs. **Ovary** ovoid, puberulous, with 1 ovule; style slender, curved before anthesis, straightening later; pollen presenter linear-filiform, quadrangular, acute, geniculate at base. **Hypogynous scales** 4, linear-subulate. **Fruit** a cylindric achene, introrse at base, minutely puberulous.

Species 1: *Orothamnus zeyheri* Pappe ex Hook., Western Cape: coastal mountains above Betty's Bay and Hermanus.

Paranomus Salisb. 2029000

(Proteoideae)
Salisbury: 67 (1807); Levyns: 3 (1970).

Nivenia R.Br.: 133 (1810) not of Vent.; Stapf *et al.*: 708 (1912).

Shrubs. **Leaves** alternate, often dimorphic, petiolate, glabrous or pubescent; lower usually pinnately dissected into terete segments; upper entire, ovate, spatulate or flabellate, or with all leaves pinnatisect. **Inflorescence** a heterothetic double raceme with sessile axillary racemes, sessile to pedunculate, cylindric, rarely globose. **Flowers** bisexual, regular, arranged up main axis in sessile groups of 4, each flower subtended by a floral bract which becomes enlarged and woody after anthesis. **Perianth** straight, cylindric in bud; tube short, glabrous, but occasionally pubescent distally; claws slender, pubescent; limbs elliptic, pubescent. **Anthers** ellipsoid, sessile, arising from base of perianth limbs. **Ovary** ellipsoid, with 1 pendulous ovule; style straight, often pubescent or partly pubescent; pollen presenter cylindric, clavate or conic-capitate. **Hypogynous scales** 4, linear-subulate. **Fruit** an ovoid to cylindric, puberulous achene. $x = 12$ (1 report).

Species 18, Western Cape: Cederberg to S Eastern Cape: Uitenhage.

Protea L. 2035000

(Proteoideae)
Linnaeus: 187, 328 (1771); Stapf *et al.*: 552 (1912); Beard: 138 (1963); Rourke: 1 (1980); Chisumpa & Brummitt: 815 (1987); Beard: 1 (1993); Brummitt & Marner: 1 (1993).

Shrubs or small trees, erect, procumbent, or caespitose and apparently acaulescent. **Leaves** alternate, acicular to oval, sessile or petiolate, glabrous to pubescent. **Inflorescence** a capitulum, terminal and solitary, but in certain caespitose species, axillary and clustered, subtended by a prominent involucre of variously coloured bracts; basal bracts scale-like, becoming progressively larger, glabrous or pubescent, often thickly bearded at apices; receptacle flat, convex or concave. **Flowers** bisexual, irregular. **Perianth** adaxially curved in bud; perianth segments 4, 3 adaxial ones fused to form a distinct sheath; abaxial segment separating completely from adaxial sheath; claws slender to filiform, enlarging proximally, glabrous or pubescent, occasionally pubescent on inner surface; limbs elliptic, narrowly oblong or linear, acute to attenuate, glabrous to markedly crinite. **Anthers** sessile to subsessile, arising from base of perianth limbs, linear to filiform, acuminate; abaxial anther sometimes reduced to a staminode. **Ovary** obconic, covered with long, straight hairs, with 1 ovule; style straight to adaxially curved, tapering subterminally, glabrous or pubescent, persistent; pollen presenter filiform, linear or capitate, longitudinally grooved. **Hypogynous scales** 4, ovate to lanceolate or linear, acuminate or retuse. **Fruit** an obconic achene, densely pubescent, with long, straight hairs, brown, ferruginous, black or white. $x = 12$.

Species ± 112, Africa; ± 83 in South Africa, mainly Western Cape and usually at higher altitudes elsewhere.

Serruria Salisb. 2030000

(Proteoideae)
Salisbury: t. 67 (1807); Stapf *et al.*: 654 (1912); Rourke: 285 (1982); Rourke: 497 (1990); Rourke: 1 (1994); Rourke: 154 (1996).

Serraria Adans.: 284, 604 (1763).

Shrubs or shrublets, erect, sprawling, or procumbent. **Leaves** alternate, usually pinnately dissected into terete segments, occasionally entire and acicular, terete, or linear. **Inflorescence** a panicle, often much branched, or frequently a terminal capitulum or a panicle of capitula; capitulum surrounded by an involucre of usually small, occasionally enlarged, coloured bracts. **Flowers** bisexual, regular or slightly irregular. **Perianth** straight or adaxially curved in bud; tube usually glabrous; claws slender to filiform, pubescent; limbs ovate-elliptic; abaxial perianth segments usually more densely pubescent than adaxial ones. **Anthers** sessile, oblong-elliptic, arising from base of perianth limbs. **Ovary** sessile, ovoid, pubescent, with 1 ovule; pollen presenter cylindric, clavate or capitate; style terete, straight or adaxially curved, glabrous, or with lower half pubescent. **Hypogynous scales** 4, rarely 0, linear-subulate. **Fruit** a pubescent, ovoid to oblong achene, beaked at apex, truncate and pedicellate at base. $x = 12$ (1 report).

Species ± 55, Western Cape: Matsikamma Mountain to the south-western districts and eastwards to George.

Sorocephalus R.Br. 2028000

(Proteoideae)
Brown: 139 (1810); Stapf *et al.*: 701 (1912); Rourke: 21 (1969).

Soranthe Salisb. ex Knight: 72 (1809).

Shrublets, erect or procumbent. **Leaves** alternate, many, imbricate, linear-acicular, terete or semiterete, mucronate. **Inflorescence** densely flowered, globose to cylindric, compound, paniculate or rarely a capitulum; lateral racemes 4–9-flowered; bracts and floral bracts free. **Flowers** bisexual, regular. **Perianth** straight in bud, cylindric; tube glabrous; claws filiform, twisting on opening, woolly, sericeous or scabrous; limbs elliptic, glabrous or pubescent. **Anthers** sessile, arising from base of perianth limbs, ovoid to ellipsoid. **Ovary** ellipsoid, pubescent or glabrous; ovule 1, pendulous; style filiform, straight; pollen presenter terminal, cylindric, ovoid or capitate. **Hypogynous scales** 4, rarely 0, subulate-linear. **Fruit** a glabrous to glabrescent achene, broadly or narrowly introrse at base.

Species 11, Western Cape: Cederberg to Klein River and Riviersonderend Mountains.

Spatalla Salisb. 2032000

(Proteoideae)
Salisbury: t. 67 (1807); Stapf *et al.*: 686 (1912); Rourke: 57 (1969).

Spatallopsis E.Phillips: 286 (1910); Stapf *et al.*: 698 (1912).

Shrublets, erect or sprawling. **Leaves** alternate, imbricate, acicular-terete or linear-semiterete, glabrous to sericeous. **Inflorescence** racemose, sessile to peduncu-

late, cylindric, rarely globose, composed of sessile to pedicellate, 1–3-flowered involucres of 4, variously fused, floral bracts; in 1-flowered involucres bracts fused and calyx-like, tightly clasping the perianth. **Flowers** bisexual, slightly to strongly irregular. **Perianth** always abaxially curved in bud, pubescent; adaxial perianth segment erect, often larger than abaxial segments and often with a galeate limb; abaxial segments equally developed; tube glabrous or pubescent. **Ovary** ovoid, glabrous or pubescent, with 1 ovule; style terete, slender, abaxially curved towards apex; pollen presenter obliquely placed at style apex, ovoid, obovoid or a flattened, cochleariform disc. **Hypogynous scales** 4, linear-subulate. **Fruit** an ovoid to cylindric achene, pedicellate, pubescent, truncate at base.

Species 20, Western Cape: Cederberg to Knysna.

Vexatorella Rourke 2036020

(Proteoideae)

Rourke: 373 (1984b).

Erect or sprawling shrubs. **Leaves** alternate, linear-spathulate to spathulate-elliptic, obtuse, entire with a single apical callus, greyish or glaucous. **Inflorescence** terminal; usually a solitary pedunculate capitulum, occasionally a panicle of 2–6 centrifugally opening pedunculate capitula. **Flowers** bisexual, regular. **Perianth**: segments 4, separating equally at anthesis, pink or cream-coloured, sweetly scented. **Style** straight, puberulous or glabrous, not elongating at anthesis; pollen presenter clavate. **Ovary** obovoid to flask-shaped, single-chambered with a single pendulous ovule. **Hypogynous scales** 4, free, subulate. **Fruit** an ovoid, puberulous to glabrous achene, beaked apically, obtuse and wrinkled basally, with an adaxial suture.

Species 4, central Western Cape and S Northern Cape.

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Ptaeroxylaceae

(Rosidae—Sapindales)

Compiled by R.H. Archer

Trees or shrubs, often aromatic, dioecious, with indistinct oil cavities in younger parts. **Leaves** opposite or subopposite, paripinnate; rachis slightly winged; leaflets asymmetrical, opposite; stipules 0. **Flowers** unisexual, regular, in contracted thyrses. **Sepals** 4, variously connate or almost free; lobes imbricate or with open aestivation. **Petals** 4, free,

valvate or imbricate. **Disc** annular, intra-staminal, fleshy. **Male flowers**: stamens 4, arising at base of disc; ovary 0. **Female flowers**: staminodes rudimentary; ovary superior, arising on disc, 2-locular, with a solitary ovule in each locule; styles 2, free or connate; stigmas capitate. **Fruit** a compressed capsule, bilobed from apex, cordate at base, 2-locular, 2-seeded, dehiscing along an inner suture, eventually suspended from bipartite axis. **Seeds** compressed, with a terminal wing.

Genera 3: the monotypic *Bottegoa* Chiov. from N East Africa was recently transferred from Sapindaceae (Verdcourt & Davies 1996); *Cedrelopsis* Baill. with 7 species occurring in Madagascar, and the more widespread *Ptaeroxylon* confined to Africa. *Rbc*L sequence data (Gadek *et al.* 1996) show Ptaeroxylaceae to be a close sister family to Rutaceae, but ongoing research may indicate the recognition of only one family, Rutaceae.

Sonder: 242 (1860); White & Styles: 547 (1966); Pennington & Styles: 442 (1975); White & Styles: 35 (1986); Dahlgren & Van Wyk: 52 (1988).

Ptaeroxylon Eckl. & Zeyh. 4157000

Ecklon & Zeyher: 54 (1834–35); Sonder: 242 (1860); White & Styles: 548 (1966); Friedrich-Holzhammer: 3 (1968), under Meliaceae; White & Styles: 35 (1986); Verdcourt & Davies: 1 (1996).

Description as for family.

Species 1: *Ptaeroxylon obliquum* (Thunb.) Radlk. (= *P. utile* Eckl. & Zeyh.), southern half of Africa, Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape; widespread in forests and scrub bush southwards to Humansdorp.

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Rafflesiaceae

(Magnoliidae—Aristolochiales)

Compiled by M. Jordaan

Holoparasitic, rootless perennials, without chlorophyll, rich in tannins, with thick, somewhat fleshy, simple stems, growing on roots; monoecious or dioecious; endophytic body in the form of strings or plates of cells inside host plant. **Leaves** reduced to alternating/spiralling coloured scales. **Inflorescence**: flowers solitary or in short, few-flowered racemes; flowering stems or branches bursting through cortex of host tissues. **Flowers** unisexual, regular, usually in axils of bracts and bracteoles; ± horseshoe-shaped nectar glands present at base of central column. **Perianth** 1-whorled; tepals 4–9, fleshy, fused at base into a very short tube. **Male flowers**: stamens 8–12; filaments fused into a stout capitate column with fused anthers at apex; anthers 2-thecous, extrorse. **Female flowers**: ovary inferior, 1-locular or by projection of parietal placentas, falsely up to 6- or more-locular; ovules very numerous, anatropous to orthotropous, uni- or bitegmic; stylar column stout; stigma globose, grooved with apex obtuse or radially lobed. **Fruit** a berry. **Seeds** many, minute, hard; embryo undifferentiated; endosperm 1 layer thick. $x = 8$ (1 report, polyploidy).

Genera 9, species ± 55, mostly tropical, some subtropical; sthn Afr.: genus 1, species 2.

Dumortier: 13 (1829); Hooker: 106 (1873) as Cytinaceae; Hooker: 116 (1880); Solms-Laubach: 1 (1901) as Rafflesiaceae; Hill: 485 (1912) as Cytinaceae; Marloth: 174 (1913) as Rafflesiaceae tribe Cytineae; Harms: 276 (1935); Meijer: 557 (1993).

Cytinus L. 2180000

Linnaeus: 576 (1764) name conserved; Hooker: 106 (1873); Hooker: 118 (1880); Hill: 485 (1912); Marloth: 174 (1913) ; Harms: 276 (1935); Adamson: 343 (1950); Webb: 50 (1964); Oliver: t. 1486 (1967); Meijer: 562 (1993).

Description as for family.

Species ± 10, Mediterranean region, Africa, Madagascar; 2 in sthn Afr., Northern, Western and Eastern Cape.

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Ranunculaceae

(Magnoliidae—Ranunculales)

Compiled by L.L. Dreyer & M. Jordaan

Perennial, sometimes annual or biennial herbs, subshrubs or lianes, sometimes aquatic or associated with water; rhizomes often ± well developed. **Leaves** alternate, often radical, or opposite, simple or compound; variously divided, incised, dentate, sometimes entire; petioles mostly sheathing at base; stipules 0 or minute. **Inflorescence** usually terminal and basically cymose, but often appearing umbellate to paniculate, or sometimes single-flowered. **Flowers** bisexual or sometimes unisexual (*Clematis*, *Thalictrum*), regular, hypogynous; floral parts spirally arranged; clearly distinct calyx and corolla only present in *Myosurus* and *Ranunculus*. **Sepals** 3–6 or more, free, petaloid or sepaloid, imbricate or valvate. **Petals** (3–)5(or more), free, usually with a nectary. **Stamens** few to many, free, centripetally initiated; anthers extrorse, with longitudinal slits. **Carpels** many or 1 or more (*Thalictrum*), free, sometimes connate; ovules 1 per carpel, anatropous, sometimes hemitropous, bitegmic or unitegmic. **Fruitlets** aggregated, sometimes solitary (*Thalictrum*), follicular, achenial, rarely baccate (*Knowltonia*). **Seeds** 1 per carpel; endosperm copious; embryo often undifferentiated when shed; cotyledons usually 2 (rarely 1), their petioles somewhat fused downwards.

Genera ± 60, species ± 1750, widespread in temperate and boreal regions of the world; sthn Afr.: genera 7, species 26.

Jussieu: 87 (1789); Harvey: 1 (1860); Merxmüller: 37 (1968); Milne-Redhead & Turrill: 1 (1952); Exell & Milne-Redhead: 89 (1960); Tamura: 563 (1993); Thulin: 21 (1993).

Key to genera

1a Leaves opposite; carpels with feathery tails:
  2a Twining or scrambling plants, becoming woody with age; sepals valvate ..... **Clematis**
  2b Erect subshrubs; sepals ± imbricate ..... **Clematopsis**
1b Leaves alternate, often radical; carpels mostly ending in a beak:
  3a True petals present, clearly different from sepals, usually with nectaries:
    4a Leaves entire, all radical; small herbs 20–50 mm high; carpels crowded on a spadix-like axis ..... **Myosurus**
    4b Leaves variously divided and/or margins not entire; herbs higher or with stems longer than 100 mm; carpels in clusters ..... **Ranunculus**
  3b True petals absent; sepals/tepals all ± similar, without nectaries:
    5a Inflorescence 1–3-flowered; flowering stems mostly with 1 or more whorls of partially united leaves ..... **Anemone**
    5b Inflorescence usually with more than 3 flowers; flowering stems without whorls of partially united leaves:
      6a Inflorescence pseudo-umbellate; carpels many, developing into drupelets ..... **Knowltonia**
      6b Inflorescence pseudopaniculate; carpels 1–several, developing into achenes ..... **Thalictrum**

Anemone L. 2541000

Linnaeus: 532 (1753); Linnaeus: 241 (1754); Harvey: 3 (1860); Killick: 258 (1977); Tamura: 576 (1993); Thulin: 22 (1993).

Perennial herbs, rarely shrublets; flowering stems usually with 1–5 whorls of (2)3(4) partly fused leaves. **Leaves** radical, alternate, much dissected or lobed, rarely entire. **Flowers** bisexual, in definite, di- or trichasial, umbelliform inflorescences or solitary. **Sepals** 4–20, petaloid, imbricate, deciduous. **Petals** 0. **Stamens** many. **Carpels** many, each with 1 pendulous ovule. **Fruitlets** clustered achenes, with or without persistent styles. $x = 7, 8$ (5, 13, 17) (polyploidy).

Species ± 120, cosmopolitan; 3 in sthn Afr., Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

Clematis L. 2542000

Linnaeus: 543 (1753); Linnaeus: 242 (1754); Harvey: 2 (1860); Exell & Milne-Redhead: 89 (1960); Ross: 169 (1972); Tamura: 29 (1993); Thulin: 22 (1993).

Perennial, woody climbers or scramblers. **Stem** scandent, sometimes erect; internodes elongate. **Leaves** opposite, usually pinnately or ternately compound with petiole and rachis twining. **Flowers** bisexual or unisexual, in axillary or terminal panicles or sometimes solitary. **Sepals** 4(5–8), petaloid, valvate. **Petals** short or 0. **Stamens** many. **Carpels** many, each with 1 pendulous ovule; style long, villous. **Fruitlets** clustered achenes with persistent, feathery styles. $x = 8$ (6, 13) (high polyploidy).

Species ± 230, north temperate, south temperate and tropical Africa; 4 in sthn Afr., widespread.

Clematopsis Bojer ex Hutch. 2542010

Hutchinson: 12 (1920); Harvey: 2 (1860), under *Clematis*; Exell & Milne-Redhead: 94 (1960); Merxmüller: 37 (1968); Brummitt: 160 (1976).

Perennial herbs, with erect stems, becoming ± woody towards base. **Leaves** opposite, simple or pinnately compound. **Flowers** bisexual, solitary or few at ends of branches. **Sepals** 4, rarely more, ± imbricate, petaloid. **Petals** 0. **Stamens** many. **Carpels** many, each with 1 pendulous ovule; style long, villous. **Fruitlets** clustered achenes with persistent, feathery styles. $x = 8$ (1 report).

Species 18, tropical and sthn Afr. and Madagascar; 1 in sthn Afr.: *Clematopsis scabiosifolia* (DC.) Hutch., Namibia, Botswana and North-West.

Knowltonia Salisb. 2541010

Salisbury: 372 (1796); Harvey: 4 (1860); Exell & Milne-Redhead: 97 (1960); Rasmussen: 16 (1979); Bond & Goldblatt: 379 (1984); Tamura: 576 (1993).

Perennial herbs with erect to horizontal rhizome. **Leaves** basal, spirally arranged, ternate to triternate, rarely simple; petiole base sheathing; leaflets ovate to trullate, ternately or pinnately incised to simple, lateral leaflets often oblique. **Flowers** bisexual, in congested cymes resembling compound, irregular umbels, umbel and umbellules surrounded by involucres of compound or simple bracts. **Sepals** 8–23, quincuncial, white, yellow or green, often tinged pink or wine-red outside, colour, form and hairiness of outer ones differing slightly from inner ones. **Petals** 0. **Stamens** many. **Carpels** many, each with 1 pendulous ovule. **Fruitlets** clustered dru-

pelets; exocarp coriaceously fleshy; endocarp fibrous. $x = 8$ (polyploidy).

Species ± 8, Africa; 8 in sthn Afr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape, with *Knowltonia transvaalensis* Szyszyl. extending into central Africa as far north as Tanzania.

Myosurus L. 2543000

Linnaeus: 284 (1753); Linnaeus: 137 (1754); Tutin: 238 (1964); Tamura: 577 (1993); Whittemore: 135 (1997).

Small, annual, stemless herbs. **Leaves** basal, linear to linear-oblong, entire. **Flowers** bisexual, terminal, solitary, pedunculate. **Sepals** 5(6 or 7), sepaloid, with long or short spurs at base. **Petals** (0)5(6 or 7), as long as or slightly shorter than sepals, narrow, with nectariferous pit at summit of each claw. **Stamens** 5–25, ± equalling sepals. **Carpels** many, borne on central axis which elongates in fruit. **Fruitlets** many, small, apiculate or aristate achenes with distinct dorsal ridges, crowded on an elongated axis. $x = 8$.

Species 15, all continents, lacking in tropical zone and east Asia, most richly represented in W North America; 1 in sthn Afr.: *Myosurus minimus* L., restricted to Western Cape.

Ranunculus L. 2546000

Linnaeus: 548 (1753); Linnaeus: 243 (1754); Harvey: 5 (1860); Adamson: 402 (1950); Milne-Redhead & Turrill: 19 (1952); Exell & Milne-Redhead: 97 (1960); Ross: 169 (1972); Tamura: 579 (1993).

Annual or perennial herbs, tufted, rhizomatous, sometimes aquatic. **Stem** branched or simple, leafy, sometimes scapose. **Leaves** alternate, often radical, entire, cordate, peltate, palmately or pinnately compound or pinnatisect. **Flowers** bisexual, in corymbiform or subpaniculiform cymes or solitary. **Sepals** 3–5, caducous. **Petals** as many as or more than sepals, usually yellow or white, with basal, nectariferous pit. **Stamens** many, shorter than sepals and petals. **Carpels** many, in several series, each with 1 ascending ovule; stigma often sessile. **Fruitlets** clustered achenes, each apiculate or rostrate with persistent style, smooth, striate, ribbed, rugose, or spiny; cotyledons 2(1), sometimes strongly fused. $x = 7$, 8 (6) (high polyploidy, B-chromosomes).

Species ± 250, cosmopolitan, mainly temperate; 7 in sthn Afr., widespread.

Thalictrum L. 2548000

Linnaeus: 545 (1753); Linnaeus: 242 (1754); Harvey: 3 (1860); Milne-Redhead & Turrill: 11 (1952); Exell & Milne-Redhead: 96 (1960); Tamura: 581 (1993).

Freely branched perennial herbs. **Leaves** alternate, with sheathing bases, ternately to pinnately compound, rarely simple. **Flowers** bisexual or male, generally small, pseudopaniculate. **Sepals** 3–10, petaloid. **Petals** 0. **Stamens** few to many, shorter than sepals. **Carpels** 1–many, each with 1 ovule; style present or 0, deciduous or persistent. **Fruitlets** 1–many clustered achenes, often delicately stalked, with a short or long beak. $x = 7$ (9, 10) (high polyploidy, B-chromosomes).

Species ± 85, north temperate and tropical America, tropical and sthn Afr.; 2 in sthn Afr., widespread in cool, sheltered localities in all the regions except Namibia, Botswana and Swaziland.

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Resedaceae

(Dilleniidae—Capparidales)

Compiled by M. Jordaan

Annual, biennial or perennial herbs, or subshrubs; stems erect, decumbent, sometimes ascending; sometimes polygamous. **Leaves** alternate or fasciculate, simple, herbaceous, lobed to pinnatipartite, entire; stipules small, glandular. **Inflorescences** terminal spikes or racemes, bracteate. **Flowers** bisexual or unisexual, strongly irregular. **Sepals** 4–6, ± valvate, free or often ± connate towards base, usually unequal, persistent or deciduous. **Petals** mostly 2–6, sometimes 0, often unequal, small, usually deciduous, laciniate, often with a membranous appendage at base of limb, free to partly fused. **Disc** sometimes present, often dilated on adaxial side. **Stamens** (2)3–20(–50), sometimes abortive, perigynous or arising on disc, often declinate, free or monadelphous at base, not covered by petals in bud; filaments free or connate at base; anthers versatile, 2-thecous, introrse, dehiscing longitudinally. **Ovary** superior, 1-locular, of 2–5 connate carpels usually open at apex; ovules many, arising on parietal placentas or at base of ovary; stigmas sessile. **Fruit** an open or closed capsule, cylindrical to globose, indehiscent, rarely baccate or with free follicles. **Seeds** many, ± reniform to ovoid or subglobose, papillose, rugulose or smooth; endosperm almost 0, but perisperm present; embryo curved.

Genera 6, species ± 80, mainly in Mediterrancan region, extending from Europe to Asia, India, SW United States, Mexico, Arabian Peninsula to NW India, arid parts of south tropical and sthn Afr; in sthn Afr.: genera 2 (1 exotic), species 3 (1 exotic).

Gray: 665 (1821); Mueller Argoviensis: 1 (1857); Hooker: 110 (1862); Mueller Argoviensis: 548 (1868); Hellwig: 236 (1891); Bolle: 659 (1936); Bullock: 28 (1958); Abdallah: 1 (1967); Abdallah & De Wit: 99 (1978).

Key to genera

Flowers on long pedicels; petals (5)6; stamens more than 15; disc present ..... ***Reseda**
Flowers sessile; petals 2(4); stamens less than 15; disc ± 0 ..... **Oligomeris**

Oligomeris Cambess. 3126000

Cambessèdes: 23, t. 25 (1839); Mueller Argoviensis: 213 (1857); Harvey: 64 (1860); Mueller Argoviensis: 584 (1868); Oliver: 103 (1868); Hellwig: 241 (1891); Burtt Davy: 131 (1926); Bolle: 684 (1936); Roessler: 1 (1966); Abdallah: 69 (1967); Leistner: 179 (1970); Thulin: 78 (1993).

Erect, ascending, or sometimes decumbent, perennial, biennial or annual herbs or low shrublets, glabrous to scabrid, usually branching at base. **Leaves** sessile, entire, linear to spathulate, chartaceous to ± succulent; stipules subulate, often caducous. **Inflorescences** densely and many-flowered spikes or spike-like racemes, elongating. **Flowers** bisexual or unisexual and then plants polygamous, subtended by a bract, sessile. **Sepals** 4 or 5, persistent, entire, herbaceous, often white-margined. **Petals** 2, rarely up to 5 or almost completely abortive, adaxial, free or up to more than half connate, entire or shallowly incised, ± oblong, alternating with posterior sepals, white. **Disc** poorly developed or 0. **Stamens** (2)3–12(13), adaxial or surrounding ovary, sometimes partly or completely abortive; filaments persistent, glabrous, filiform-subulate, usually slightly monadelphous posteriorly; anthers subglobose-oblong, apex notched, introrsely splitting. **Ovary** of 4 or 5 carpels, 1-locular, not completely fused at top, 4 or 5 apical, conical points bearing stigmatic surfaces; ovules 5–15 per placenta, in 2–5 rows. **Fruit** an indehiscent capsule, subglobose to ovoid, glabrous or scabridulous, membranous, sessile, gaping at top, slightly inflated, obtusely 4- or 5-angled. **Seeds** many, ovoid to subglobose, black or dark brown; testa very glossy and smooth; embryo curved. $x = 8$ (6, 7) (polyploidy).

Species 3, mainly Canary Islands, but also SW North America, N and NE Africa, SW Asia to W India; 2 endemic in sthn Afr., Namibia, Botswana, North-West, Gauteng, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

***Reseda** L. 3125000

Linnaeus: 448 (1753); Linnaeus: 207 (1754); Gray: 665 (1821); Mueller Argoviensis: 96 (1857); Hooker: 111 (1862); Mueller Argoviensis: 555 (1868); Oliver: 103 (1868); Hellwig: 240 (1891); Bolle: 687 (1936); Adamson: 424 (1950); Elffers & Taylor: 1 (1958); Taylor: 245 (1960); Yeo: 346 (1964); Zohary: 331 (1966); Leistner: 178 (1970); Meikle: 176 (1977); Abdallah & De Wit: 99 (1978); Thulin: 78 (1993).

Stefaninia Chiov.: 77 (1929).

Erect or decumbent herbs or shrublets, glabrous or hairy. **Leaves** simple, trifid, lobed to pinnatipartite. **Inflorescences** many-flowered spike-like racemes, bracteate. **Flowers** bisexual, on long pedicels. **Sepals** (4)5 or 6(–9), unequal, usually persistent. **Petals** usually 5 or 6, free, white or yellow, unequal, usually with a dilated, basal portion and a variously dissected, rarely entire, upper portion. **Disc** usually present, campanulate or funnel-shaped, often dilated on adaxial side. **Stamens** 12–25(–40), arising on disc. **Ovary** of 2–5 carpels, 1-locular, usually ± open at top, 2–5 apical, conical points bearing stigmatic surfaces; ovules many, pendulous and arranged in rows. **Fruit** a membranous, leathery, usually indehiscent capsule gaping at apex. **Seeds** many, ± reniform, smooth, rough or papillose. $x = 6$, 10 (7, 8, 13) (polyploidy, B-chromosomes).

Species ± 55; in the Mediterranean region, the Macaronesian Islands, NE and E Africa, Arabian Peninsula and eastwards to NW India, also introduced in various temperate regions; 1 introduced into sthn Afr.: **Reseda lutea* L. subsp. *lutea* var. *nutans* Boiss., widely naturalised, North-West, Gauteng, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

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Rhamnaceae

(Rosidae—Rhamnales)

Compiled by C.L. Bredenkamp

Trees or shrubs, erect or scandent, often spiny, rarely dioecious. **Leaves** alternate, sometimes opposite, simple, entire or serrate, pinnately veined, sometimes palmately veined (*Ziziphus*), often glossy; stipules usually present. **Flowers** usually bisexual, regular, small, in cymes, umbels, spikes or heads. **Calyx** (4)5-lobed, tubular, valvate. **Petals** (0 or

4)5, free, arising in throat of calyx tube or on outer margin of disc, usually small, sometimes clawed, often embracing the stamens. **Disc** usually prominent, lining calyx tube. **Stamens** 4 or 5, arising with petals and opposite them, not alternating with the petals as in the related Celastraceae; filaments usually linear, rarely dilated; anthers (1)2-thecous, opening by longitudinal slits. **Ovary** superior or partly embedded in a prominent disc or ± inferior, 2 or 3(4)-locular, with 1(2) basal ovules in each locule; styles 2 or 3(4), free or ± connate. **Fruit** a drupe or capsule, often 3-coccous, free, partly or wholly enclosed in persistent calyx tube. **Seed** solitary in each locule.

Genera ± 58, species 900, cosmopolitan in tropical and subtropical countries; sthn Afr.: genera 9, species 203.

Jussieu: 376 (1789); Candolle: 19 (1825); Sonder: 475 (1860); Drummond: 419 (1966); Suessenguth: 1 (1969).

Key to genera

1a Leaves opposite; stipules interpetiolar ..... **Lasiodiscus**
1b Leaves alternate, approximate, sometimes opposite, but then stipules not interpetiolar:
2a Climbers with tendrils ..... **Helinus**
2b Small trees, shrubs, or undershrubs:
3a Fruit a fleshy or dry drupe:
4a Leaves alternate:
5a Leaves palmately veined ..... **Ziziphus**
5b Leaves pinnately veined :
6a Leaves with entire or remotely toothed margins ..... **Berchemia**
6b Leaves finely toothed ..... **Rhamnus**
4b Leaves opposite or approximate in pairs:
7a Inflorescence a short, axillary umbel; spines usually present ..... **Scutia**
7b Inflorescence an axillary raceme or cyme; spines absent ..... **Rhamnus**
3b Fruit a capsule:
8a Disc inconspicuous; flowers in lax, terminal and axillary panicles ..... **Noltea**
8b Disc evident; flowers solitary, in cymes or racemes, spikes or heads:
9a Flowers in racemes, spikes or heads; rarely solitary; style simple ..... **Phylica**
9b Flowers axillary, solitary or in few-flowered peduncled cymes; style 3-partite:
10a Leaf lamina 40–100 mm long, ± crenate, elliptic to elliptic-ovate ..... **Colubrina**
10b Leaf lamina 15 mm long, entire, ± ovate-cordate ..... **Helinus**

Berchemia Neck. ex DC. 4868000

Candolle: 22 (1825) name conserved; Drummond 424 (1966); Johnston: 31 (1972).

Phyllogeiton as to *P. zeyheri* (Sond.) Suess.: 182 (1953).

Shrubs or small trees, unarmed. **Leaves** alternate, petioled, elliptic, entire. **Flowers** in small, axillary cymes or terminal racemes of cymes. **Calyx** 5-parted; segments ovate, with keel on inner face. **Petals** 5, shorter than calyx, spatulate, clawed. **Disc** tumid. **Stamens** 5, as long as petals, inserted outside disc. **Ovary** immersed in disc, 2-locular, with a solitary, basal ovule in each locule; style thick, conical, 2-lobed; stigmas glandulose. **Fruit** a drupe, ellipsoid; endocarp woody. $x = 12$.

Species 12, East Africa to E Asia; 2 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland and KwaZulu-Natal.

Colubrina Rich. ex Brongn. 4882000

Brongniart: 61 (1826); Brongniart: 368 (1827) name conserved; Van Wyk & Schrire: 379 (1986).

Evergreen scandent shrubs to lax trees; branchlets terete, often reduced to axillary spines. **Leaves** alternate, rarely subopposite, petiolate; eglandular, elliptic to elliptic-ovate; stipules conspicuous. **Flowers** 5-merous, borne in cymose, few-flowered inflorescences; bracts minute, deltoid, caducous; receptacle hemispherical with calyx and androecium borne at rim. **Sepals** valvate in bud, deltoid, spreading. **Petals** 0. **Stamens** erect; anthers incurved, 2-thecous, dorsifixed, versatile. **Disc** thick and fleshy. **Ovary** 3-locular, entirely immersed in and adnate to disc and receptacle; ovules subsessile on basal placentas, 1 per locule; styles 3, free, tapering off terminally; stigma indistinct. **Fruit** capsular, faintly 3-coccous with stipe and basal part of capsule (receptacle) persistent. **Seeds** 1 per locule, oblong-obovate; testa hard and shiny; embryo flat, with fleshy, broadly elliptical cotyledons; endosperm abundant. $x = 8$ (polyploidy).

Species 1: *Colubrina nicholsonii* A.E. van Wyk & Schrire, three small populations in Pondoland (Eastern Cape): Daza and Mtentu River populations are protected in the Mkambati Game Reserve, third population in riverine forest along Mpunzaana River.

Helinus E.Mey. ex Endl. 4905000

Endlicher: 1102 (1840); Drummond: 435 (1966); Johnston: 14 (1972) name conserved.

Marlothia Engl.: 39 (1899); Miller: 51 (1952).

Climbing shrubs with tendrils. **Leaves** alternate, petioled, more or less ovate-cordate; stipules linear, deciduous. **Flowers** in axillary, peduncled umbels. **Calyx** 5-lobed; tube campanulate; lobes slightly keeled on inner face. **Petals** 5, ± as long as calyx lobes, cucullate, inserted on margin of disc. **Disc** epigynous, flat, completely filling the calyx tube. **Stamens** 5, equalling petals. **Ovary** inferior, 3-locular; style short, 3-fid. **Fruit** obovate-globose, areolate at apex, 3-coccous; cocci at length dehiscent, with a 3-partite, central axis. **Seeds** black, somewhat planoconvex, with keel on flat face.

Species 6, Africa, Madagascar to India; 2 in sthn Afr., eastern parts of Mpumalanga to KwaZulu-Natal and Eastern Cape near Uitenhage.

Lasiodiscus Hook.f. 4888000

Hooker: 381 (1862); Drummond: 438 (1966); Figueiredo: 497 (1995).

Shrubs or small trees. **Leaves** opposite or subopposite, shortly petiolate; stipules large, interpetiolar. **Flowers** in axillary, pedunculate cymes or fascicles. **Sepals** 5. **Petals** 5, cucullate. **Stamens** 5, inserted under margin of disc. **Disc** thick, with free margin. **Ovary** half-inferior,

3-locular; style 3-lobed. **Fruit** a capsule, 3-lobed, tardily loculicidally dehiscent.

Species 12, Africa, Madagascar; 1 in sthn Afr.: *Lasiodiscus pervillei* Baill. subsp. *pervillei*, KwaZulu-Natal.

Noltea Rchb. 4880000

Reichenbach: 145 (1828); Sonder: 478 (1860).

Shrub, glabrous. **Leaves** discolorous, alternate, shortly petioled, elliptic or oblong, margin serrated. **Flowers** in terminal and axillary panicles. **Calyx** 5-lobed; tube broadly campanulate; lobes ovate, ± as long as tube. **Petals** 5, shorter than calyx, cucullate, embracing stamens. **Disc** inconspicuous. **Stamens** 5. **Ovary** partly adnate to calyx tube, 3-locular; style shortly 3-lobed. **Fruit** a round capsule, valves with a keel on upper portion, separating septicidally from a 3-partite, central axis. **Seeds** convex on one face, flattened and with keel on the other.

Species 1: *Noltea africana* (L.) Rchb., KwaZulu-Natal, Western and Eastern Cape.

Phylica L. 4886000

Linnaeus: 195 (1753); Sonder: 479 (1860); Pillans: 3 (1942).

Shrublets, shrubs, rarely small trees. **Leaves** alternate, often ericoid or ovate to lanceolate, with revolute margins; stipules rarely present. **Flowers** solitary, axillary or in spikes, racemes, or heads. **Calyx** 5-lobed; lobes ovate to linear, often with a prominent median nerve or keel on inner face; tube variably expanded, usually with some type of pubescence. **Disc** usually fused with calyx tube, variable. **Petals** 5, rarely fewer or absent, small, clawed. **Stamens** 5, inserted below petals; filaments short; anthers 1- or 2-thecous. **Ovary** inferior, 3-locular; style minutely 3-lobed. **Fruit** mostly capsular, crowned with persistent base of calyx. **Seeds** ± 3-sided, smooth.

Species ± 188, Madagascar, 1 on Tristan da Cunha but mostly in sthn Afr., especially Western Cape, 2 extending further: *Phylica thodei* E.Phillips on the Drakensberg in Free State, KwaZulu-Natal and Lesotho, *P. paniculata* Willd. extending to North-West, Gauteng, Mpumalanga, Swaziland and KwaZulu-Natal.

Rhamnus L. 4875000

Linnaeus: 93 (1753); Sonder: 176 (1860); Drummond: 427 (1966); Johnston: 17 (1972).

Shrubs or small trees. **Leaves** alternate or opposite, simple, petioled, entire or toothed; stipules small, usually deciduous. **Flowers** bisexual or sometimes with some male and female flowers on different plants, in axillary cymes or racemes. **Calyx** urceolate or flat; lobes 4 or 5, erect or spreading, keeled on inner face. **Petals** (0)4 or 5, cucullate or flat. **Disc** inconspicuous, lining calyx tube. **Stamens** 4 or 5, shorter than calyx lobes. **Ovary** superior, sometimes immersed in disc, 2- or 4-locular; styles 2–4, free or united. **Fruit** a fleshy or dry drupe, globose or oblong in outline. **Seed** obovoid. $x = 12$ (aneuploids).

Species ± 125, ± cosmopolitan; 1 in sthn Afr.: *Rhamnus prinoides* L'Hér., Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

Scutia (DC.) Brongn. 4874000

Brongniart: 362 (1827) name conserved; Sonder: 477 (1860); Drummond: 428 (1966).

Shrubs, unarmed or spiny. **Leaves** opposite, subopposite or approximating in pairs, shortly petioled, entire or toothed; stipules minute, deciduous. **Flowers** in simple, axillary umbels, slightly longer than petioles. **Calyx** 5-lobed, somewhat fleshy; tube urceolate or campanulate; lobes keeled on inner face. **Petals** 5, shorter than calyx, shortly clawed. **Disc** inconspicuous, lining calyx tube. **Stamens** 5, subequalling petals. **Ovary** superior, 2- or 4-locular. **Fruit** an ovoid or subglobose, dry or somewhat fleshy drupe. **Seeds** usually solitary.

Species 3, fairly cosmopolitan in tropical parts; 1 in sthn Afr.: *Scutia myrtina* (Burm.f.) Kurz., Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, mostly in scrub bush of Eastern Cape, but extending to Western Cape.

Ziziphus Mill. 4861000

Miller: [1547] (1754); Sonder: 475 (1860); Drummond: 419 (1966); Johnston: 23 (1972).

Trees or shrubs, sometimes decumbent or with rhizomes, often spinescent. **Leaves** alternate, petioled, entire or toothed, palmately veined. **Flowers** small, in short, axillary cymes. **Calyx** 5-fid; lobes keeled within. **Petals** 5(0), shorter than sepals, spatulate, usually clawed. **Disc** flat, 5- or 10-angled, adhering to calyx tube. **Stamens** 5, inserted outside disc, reflexed. **Ovary** superior, immersed in disc, 2(3 or 4)-locular; styles 2 or 3, free or connate; stigmas papillose. **Fruit** a drupe, sometimes the size of a cherry. **Seeds** usually solitary, suborbicular or elliptic, compressed. $x = 12$ (10, 13) (high polyploidy).

Species ± 86, mostly in E Asia and East Indies; 6 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Northern and Eastern Cape.

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Rhizophoraceae

(Rosidae—Rhizophorales)

Compiled by C.L. Bredenkamp

Trees or shrubs, often maritime (mangroves). **Leaves** opposite, rarely whorled, simple, usually entire, sometimes crenate or serrulate, petiolate; stipules interpetiolar, falling early but leaving a thin scar. **Flowers** bisexual, regular, in cymes, or rarely solitary or capitate; bracts sometimes present. **Calyx** 4–15-lobed, lobes usually valvate; tube ± adnate to ovary, persistent. **Petals** free, as many as calyx lobes and often shorter than they, sessile or clawed, sometimes enveloping stamens, emarginate, 2-fid, or lobed at apex. **Stamens** 2–4 times as many as petals, rarely equal in number, epipetalous or arising from calyx tube, variously placed in relation to disc; filaments shorter to longer than petals; anthers 4-locular and dehiscing longitudinally or (in *Rhizophora*) multithecous and dehiscing by a ventral valve. **Ovary** usually inferior, rarely superior, (1)2–6-locular; ovules 2 per locule, with axile placentation; style simple; stigma simple or lobed. **Fruit** either a leathery 1-seeded berry (mangroves) or a septicidal 2–4-locular capsule, with 1 seed per locule (*Cassipourea*), crowned with persistent calyx; locule 1-seeded by abortion. **Seeds** pendulous, either germinating on the tree (mangroves) or arillate (*Cassipourea*).

Genera ± 16, species ± 120; fairly cosmopolitan in tropical and subtropical parts of Africa, Asia and America, often of mangrove habitat; sthn Afr.: genera 4, species 8.

Sonder: 513 (1862) as Rhizophoreae; Torre & Gonçalves: 81 (1978).

Key to genera

1a Plants of inland forest and coastal bush; fruit a capsule; seeds arillate, not germinating while on the plant ..... **Cassipourea**
1b Plants of mangrove habitat (in estuaries); fruit a leathery berry usually germinating on the plant; seeds without aril:
2a Calyx lobes 8–15; flowers solitary, ± 15 mm long ..... **Bruguiera**
2b Calyx lobes 4 or 5(6); flowers usually in cymes, up to 10 mm long:
3a Leaves mostly elliptic with midrib produced into a caducous mucro; anther filaments shorter than anthers; hypocotyl of germinating seed not ridged ..... **Rhizophora**
3b Leaves mostly obovate, without mucro; anther filaments longer than anthers; hypocotyl longitudinally ridged ..... **Ceriops**

Bruguiera Savigny 5526000

Savigny: 696 (1798); Sonder: 514 (1862).

Glabrous evergreen trees or shrubs (mangroves). **Leaves** opposite, oblong to elliptic, leathery, lower surface often with small black dots. **Flowers** axillary, usually solitary, ebracteate. **Calyx** 8–15-lobed, leathery; tube turbinate, adhering to ovary; lobes longer than tube, linear-lanceolate, keeled on inner face, valvate, accrescent. **Petals** as many as calyx lobes, oblong, concave, bifid, with each lobe and midrib produced into awns, woolly or pilose on margins at base. **Stamens** twice as many as petals, in pairs opposite and embraced by petals; filaments shorter than petals; anthers shorter than filaments, linear to linear-oblong, hooked at apex. **Ovary** inferior, 2–4-locular, with 2 ovules in each locule; style nearly as long as calyx lobes, shortly 2–4-lobed. **Fruit** a turbinate or cylindric leathery berry, wrinkled and crowned with persistent calyx; 1-seeded by abortion. **Seeds** 1 by abortion, pendulous, germinating before fruit-fall and developing a hypocotyl with longitudinally ridges. $x = 18$ (B-chromosomes).

Species 6, Africa to Asia and Australia; 1 in sthn Afr.: *Bruguiera gymnorrhiza* (L.) Lam., KwaZulu-Natal to Eastern Cape on Transkei coast as far south as the Willowvale District.

Cassipourea Aubl. 5529000

Aublet: 528 (1775); Alston: 241 (1925); Torre & Gonçalves: 89 (1978).

Weihea Spreng.: 559 (1825). *Dactylopetalum* Benth.: 79 (1858).

Trees or shrubs. **Leaves** decussate or rarely whorled, shortly petiolate, elliptic to obovate, entire or serrate; stipules caducous. **Flowers** axillary, solitary or clustered; bracts present. **Calyx** 4–7-lobed; tube ± campanulate; lobes ovate to lanceolate, often reflexed, valvate. **Petals** 4–7, as long as calyx lobes, linear to oblong-spatulate, laciniate, fimbriate or deeply 5-lobed. **Stamens** 8–40, outside, on, or inside a fleshy or membranous disc, as long or up to 3 times as long as calyx lobes; anthers oblong. **Ovary** 2–4-locular, rarely incompletely so at apex, free or slightly adnate to base of calyx, with 2 pendulous ovules in each locule; style longer than ovary, obscurely lobed. **Fruit** a capsule, sometimes berry-like at first, septicidally dehiscent. **Seeds** 2–4, compressed or angled. $x = 16$ (polyploidy).

Species ± 70, mainly tropical and sthn Afr., also tropical America and India; 5 in sthn Afr., northern Kruger National Park and escarpment of Northern Province and Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape to Komga District.

Ceriops Arn. 5522000

Arnott: 363 (1838); Torre & Gonçalves: 85 (1978).

Glabrous evergreen trees of small to medium size, mangroves with stilt-roots up to 1 m tall. **Leaves** decussate, clustered at ends of twigs, entire, leathery; stipules lanceolate. **Flowers** in (2–)4–many-flowered, condensed cymes; bracteoles 2 at base of flower, partly connate, cupular. **Calyx** deeply 5- or 6-lobed. **Petals** 5 or 6, white, arising at margin of disc, each enwrapping a pair of stamens, sometimes cohering at base by uncinate-hairy margins, fimbriate or with 2 or 3 clavate appendages. **Disc** cupular, shallowly lobed. **Stamens** twice as many as petals. **Ovary** half-inferior, 3-locular, with 2 ovules in each locule; style simple; stigma simple or somewhat 2- or 3-lobed. **Fruit** ovoid or elongate, mainly superior. **Seeds** 1 by abortion, germinating on plant and developing a ridged hypocotyl. $x = 18$.

Species 2, tropical coastal mud banks from East Africa to East Indies and N Australia; 1 in sthn Afr.: *Ceriops tagal* (Perr.) C.B.Robinson, KwaZulu-Natal coast.

Rhizophora L. 5523000

Linnaeus: 443 (1753); Sonder: 513 (1862); Torre & Gonçalves: 82 (1978).

Glabrous evergreen trees or shrubs (mangroves). **Leaves** opposite, ovate or elliptic, acuminate, leathery, black-dotted on lower surface; stipules lanceolate. **Flowers** in axillary 1–3-flowered, pedunculate cymes; with 2 bracteoles. **Calyx** 4- or 5-lobed, leathery; tube short, adnate at base to ovary; lobes oblong or ovate, ribbed on apical part of upper surface, valvate, persistent. **Petals** 4(5), arising at base of fleshy disc, lanceolate with inflexed margins, entire, sometimes woolly, sometimes with stalked gland at apex; pedicels long, thick. **Stamens** 4 epipetalous and 4–8 episepalous, lying in pairs in concave surface of petals and embraced by their inflexed margins; filaments short; anthers lanceolate, apiculate, many-thecous, opening by a ventral valve; pollen grains conspicuous. **Ovary** half-inferior, 2-locular, with 2 pendulous ovules in each locule; style conical, slightly bifid at tip. **Fruit** a leathery, ovoid, obconic, or cylindric berry, surrounded at base by persistent calyx. **Seeds** 1 by abortion; embryo germinating on plant, perforating apex of fruit and falling out of it. $x = 18$.

Species ± 8, cosmopolitan on shores of tropical Africa, Asia and America; 1 in sthn Afr.: *Rhizophora mucronata* Lam., KwaZulu-Natal coast to Eastern Cape (Transkei).

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Rhynchocalycaceae

(Rosidae—Myrtales)

Compiled by C.L. Bredenkamp and R.H. Archer

Evergreen trees up to 12 m high, young shoots terete or slightly oval in transection, glabrous. **Leaves** opposite, decussate, simple, coriaceous, margin entire, rolled under; ± sessile when young, petiolate later; stipules rudimentary, very small, lateral, marcescent. **Inflorescence** a multifloral panicle, mainly terminal; bracts usually caducous. **Flowers** bisexual, regular, hexamerous. **Sepals** 6, white and petal-like, recurved, valvate and distinctly beaked in bud, persistent; hypanthium (calyx tube) short. **Petals** 6, free, arising on rim of hypanthium and alternating with sepals, conspicuously and narrowly clawed, recurved, fragile, fugacious; limb ± orbicular, margin lacerate, hood-like and covering anthers in bud only. **Stamens** 6, antepetalous, arising near inner rim of hypanthium; filaments ± terete; anthers sub-basifixed, versatile, 2-thecous, 4-sporangiate, introrse, longitudinally dehiscent; connective elliptical with lateral sporangia, inflexed in bud. **Disc** absent. **Ovary** superior, 2(3)-locular, bilaterally compressed; style stout, shorter than ovary, basal part persistent; stigma capitate, covered by minute papillae; ovules ± 15–20 per locule, anatropous, pleurotropous, superposed in a single vertical series; placentation axile. **Fruit** a dorsiventrally compressed (rarely trigonous) capsule, loculicidal at apex, reddish brown. **Seeds** ± 15–20 per locule, depressed-ovoid, narrowly winged (expanded raphe); testa thin and papery, rather smooth, brownish, without endosperm; embryo ± flattened, cotyledons folded inside.

Rhynchocalycaceae is a monotypic family proposed by Johnson & Briggs (1984). *Rhynchocalyx lawsonioides* Oliv. is a rare, but locally quite common, evergreen tree endemic to the sandstone (Natal Group; previously known as Table Mountain Sandstone) region of S KwaZulu-Natal and Pondoland (Eastern Cape). First collected in 1884, it was only rediscovered in 1966 (Strey & Leistner 1968). It grows mainly on forest margins, often near water courses.

Hiroshi & Raven: 836 (1984); Johnson & Briggs: 700 (1984); Dahlgren & Van Wyk: 45 (1988).

Rhynchocalyx Oliv. 5495000

Oliver: 8, t. 234 (1895); Strey & Leistner: 9 (1958); Pooley: 346 (1993).

Description as for family.

Species 1: *Rhynchocalyx lawsonioides* Oliv., forests of S KwaZulu-Natal.

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Roridulaceae

(Dilleniidae—Ericales)

Compiled by M. Jordaan

Sparsely branched, woody, glanduliferous, viscid shrublets or shrubs, with leaves aggregated near tips of branches, trapping but not absorbing contents of insects; root system poorly developed. **Leaves** alternate, simple, sessile, flat, linear, lower soon dropping off, margins smooth or with long, filiform teeth, furnished with long, immovable, gland-tipped tentacles, yellowish green; stipules 0. **Inflorescence** a few-flowered panicle, pedunculate, flowers solitary or aggregated in axils of linear bracts; pedicels short or long. **Flowers** bisexual, regular, hypogynous. **Sepals** 5, green, free or fused at base, imbricate, glanduliferous, persistent. **Petals** 5, free, imbricate, broadly ovate or obovate, entire, glabrous, purple or crimson to nearly white, persistent or deciduous. **Stamens** 5, opposite sepals; filaments distinct, erect; anthers elongate, introrse, incurved in bud, subtended by a basal swelling containing a nectariferous cavity and 2 semifree thecae which open by apical pores, suddenly springing upright and shedding pollen when touched. **Ovary** superior, 3-locular, each locule with 1–4 ovules on an axillary placenta; style simple; stigma apical. **Fruit** a 3-valved loculicidal capsule. **Seeds** fairly large, warty or honeycombed, becoming mucilaginous when moistened, rich in endosperm.

Monogeneric with 2 species, endemic to the Western Cape.

Endlicher: 906 (1839) as Droseraceae; Sonder: 75 (1860); Drude: 268 (1891) as Droseraceae: Roriduleae; Marloth: 26 (1925); Diels: 346 (1930); Obermeyer: 202 (1970); Dahlgren & Van Wyk: 61 (1988).

Roridula is sometimes combined with *Byblis* in the Australian family Byblidaceae, e.g. Hutchinson (1959), Cronquist (1981) and Mabberley (1997).

Roridula L. 3138000

Linnaeus: 567 (1764); Candolle: 320 (1824); Endlicher: 908 (1839); Sonder: 79 (1860); Marloth: 151 (1903); Marloth: 59 (1910); Marloth: 29 (1925); Diels: 346 (1930); Obermeyer: 202 (1970); Dahlgren & Van Wyk: 61 (1988).

Description as for family.

Species 2, endemic in SW Western Cape.

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Rosaceae

(Rosidae—Rosales)

Compiled by M. Jordaan

Deciduous or evergreen trees, shrubs or herbs, usually perennial, erect, scandent or prostrate, sometimes stems or leaves armed with prickles or thorns; plants rarely dioecious or monoecious. **Leaves** alternate or rarely opposite or borne in groups of 2 or 3 at each node, simple or compound, often with a toothed margin; petiole often dilated at base, 2-glandular at apex; stipules 2, free or adnate to petiole, sometimes caducous, rarely obsolete. **Inflorescences** corymbose, racemose or paniculate, or flowers solitary; with or without bracteoles. **Flowers** mostly bisexual, rarely unisexual, regular, often large, with well developed, flat, convex or concave, often hollow receptacle/calyx tube/hypanthium. **Calyx**: tube short or long; lobes 5, rarely (0)3–many, imbricate, occasionally with outer, alternating lobes forming an epicalyx. **Disc** lining calyx tube sometimes tumid or lobed. **Petals** as many as calyx lobes, usually free, inserted below margin of disc, imbricate or convolute, often deciduous, or 0. **Stamens** 1–many, sometimes biseriate, usually inserted with petals; filaments usually free and filiform, sometimes connate; anthers mostly small, 2-thecous, dehiscing by longitudinal slits. **Ovary** superior or inferior, 1–many carpels, in 1–many rows, free or connate to varying degrees together or to calyx tube, sessile or stalked; ovule 1 or 2, rarely many in each carpel, ascending or pendulous, anatropous to hemitropous or campylotropous, bitegmic; styles as many as carpels, free or rarely connate, inserted at base of ventral face of carpels, sometimes terminal; stigmas capitate to plumose. **Fruit** various, dry or fleshy, 1–many achenes or follicles crowded on a dry or fleshy receptacle, or drupes, or pomes. **Seeds** erect or pendulous; endosperm usually 0; embryo small, straight or bent.

Genera ± 107, species ± 3 000, subcosmopolitan but mostly in temperate and cooler parts of the northern hemisphere; sthn Afr.: genera 18 (9 exotic), species 172 (± 30 exotic). The family contains many important ornamentals, e.g. **Cotoneaster*; **Crataegus*, Hawthorn; **Pyracantha*, Fire thorn; **Rosa*, roses; and fruits, e.g. **Cydonia*, Quince; **Eriobotrya*, Loquats; **Fragaria*, Strawberry; **Malus*, Apples; **Pyrus*, Pears, etc.

Jussieu: 334 (1789); Candolle: 525 (1825); Hooker: 601 (1865); Focke: 1 (1894); Engler: 125 (1912); Phipps *et al.*: 2209 (1990) (subfamily Maloideae).

Classification of Rosaceae (adapted from Mabberley 1997)

I. Subfamily ROSOIDEAE (Gynoecium superior, of 2 or more free carpels, each with 1 ovule, ripening as achenes or drupelets):
  1. Tribe **Potentilleae** (Carpels many on convex, fleshy or dry receptacle): **Duchesnea*, **Fragaria*, *Geum*, *Potentilla*, *Rubus*
  2. Tribe **Sanguisorbeae** (Receptacle urn-shaped, usually hard, enclosing 2 or more achenes): *Acaena*, *Agrimonia*, *Alchemilla*, *Cliffortia*, *Leucosidea*, **Sanguisorba*
  3. Tribe **Roseae** (Receptacle soft at maturity, enclosing many free carpels): **Rosa*

II. Subfamily MALOIDEAE (Gynoecium inferior, of 2–5 carpels, ripening as a pome): **Cotoneaster*, **Crataegus*, **Cydonia*, **Pyracantha*, **Pyrus*

III. Subfamily PRUNOIDEAE (Gynoecium superior, carpel 1, with 1 ovule, ripening as a drupe): *Prunus*

Key to genera

1a Low or tall perennial herbs or unarmed low shrubs:
  2a Flowers with distinct petals:
    3a Carpels 2, rarely 3 ..... **Agrimonia**
    3b Carpels several to many:
      4a Styles persistent, long, hooked at fruiting; carpels in dense hairy cluster ..... **Geum**
      4b Styles deciduous, short, not hooked at fruiting; carpels not forming a hairy cluster:
        5a Leaves pinnate or palmate; receptacle at fruiting dry ..... **Potentilla**
        5b Leaves ternate to 5-foliolate; receptacle at fruiting swollen and red:
          6a Petals yellow; receptacle not pulpy ..... ***Duchesnea**
          6b Petals white or pink; receptacle pulpy (Strawberry) ..... ***Fragaria**
  2b Flowers apetalous:
    7a Flowers in leafy cymes; epicalyx present ..... **Alchemilla**
    7b Flowers stalkless in long-stalked, leafless heads or spikes; epicalyx 0:
      8a Receptacle spiny at fruiting stage; stamens 2–10; stigmas peltate, dilated, fimbriate or penicillate ..... **Acaena**
      8b Receptacle not spiny at fruiting stage; stamens 4–30; stigmas brush-like ..... ***Sanguisorba**
1b Trees, shrubs or scramblers:
  9a Stems and/or branches and/or leaves armed with prickles or thorns:
    10a Leaves compound, imparipinnate; leaflets 3–7; shrubs or scramblers armed with prickles:
      11a Ovary (carpels) superior; calyx tube not becoming fleshy; fruit succulent, collection of many 1-seeded drupelets ..... **Rubus**
      11b Ovary (carpels) usually inferior; the calyx tube becoming fleshy; fruit dry; achenes free within enlarged receptacle ..... ***Rosa**
    10b Leaves simple, not divided; shrubs with branches with thorns in axils of leaves, prickles 0:
      12a Deciduous; leaves irregularly serrate; seeds 1 or 2 ..... ***Crataegus**
      12b Evergreen; leaves entire or nearly so; seeds 5 ..... ***Pyracantha**
  9b Stems, branches and leaves unarmed:
    13a Leaves imparipinnate, trifoliolate or unifoliolate, but then petals 0 and flowers wind-pollinated:
      14a Leaves trifoliolate or unifoliolate; ericoid shrubs; flowers solitary; petals 0; stigmas plumose ..... **Cliffortia**
      14b Leaves imparipinnate; flowers in erect racemes; petals present; stigmas channelled, hooked. ..... **Leucosidea**
    13b Leaves simple, not divided; petals present; flowers insect-pollinated:
      15a Leaf margins crenate or serrate; inflorescences racemose, fasciculate or umbellate:
        16a Inflorescences racemose; carpels free from receptacle; fruit a drupe ..... **Prunus**
        16a Inflorescences fasciculate or umbellate; carpels connate to receptacle at least in lower half; fruit a pome (Pears) ..... ***Pyrus**
      15b Leaf margins entire; inflorescences cymose or flowers solitary:
        17a Flowers in 2–many-flowered inflorescences; petals 5 mm or less long; fruit small, less than 20 mm long, red or black ..... ***Cotoneaster**
        17b Flowers solitary (Quince); petals longer than 5 mm; fruit large, 30 mm or longer, green, yellow or brown ..... ***Cydonia**

Acaena L. 3386000

Linnaeus: 145 (1771); Jussieu: 336 (1789); Kunth: 231 (1823); Candolle: 592 (1825); Endlicher: 1244 (1840); Harvey: 290 (1862); Hooker: 623 (1865); Focke: 46 (1894); Bitter: 489 (1912); Romoleroux: 62 (1996).

Evergreen perennial herbs or undershrubs, decumbent or spreading, with taproot; bark on old branches reddish brown, thin and exfoliating. **Leaves** alternate or sometimes all radical, imparipinnate with leaflets incised or serrate; stipules connate and adnate to base of petiole. **Inflorescences** lateral or terminal racemes, heads or interrupted spikes. **Flowers** bisexual, bracteate. **Calyx**: tube ± obconic, narrowed at apex, usually armed with straight or hooked, few to many spines, sometimes villous; lobes 3–7, valvate, persistent or deciduous. **Petals** 0. **Stamens** (1)2–4(–10), inserted in throat of calyx tube;

anthers dorsifixed, didymous. **Disc** lining calyx tube almost closing calyx tube mouth. **Gynoecium** of 1 or 2 free carpels; ovules solitary in each carpel, pendulous; styles subterminal, short; stigmas dilated, peltate, fimbriate or penicillate. **Fruit** of 1 or 2 coriaceous achenes firmly enclosed in hollow hardened receptacle, which is almost closed at summit and furnished with prickles or awns barbed with reflexed hairs. **Seeds** ovoid; testa thin. $x = 7$ (aneuploids, polyploidy).

Species ± 100, mainly in cold areas of the southern hemisphere, South America, Atlantic Ocean islands, Australia and New Zealand; a few species are reaching as far north as California and Hawaii; many naturalised elsewhere; 1 in sthn Afr.: *Acaena latebrosa* Aiton, Western Cape.

Agrimonia L. 3376000

Linnaeus: 446 (1753); Linnaeus: 206 (1754); Jussieu: 336 (1789); Candolle: 587 (1825); Endlicher: 1243 (1840); Harvey: 290 (1862); Hooker: 622 (1865); Focke: 43 (1894); Burtt Davy: 318 (1932); Henderson & Anderson: 166 (1966); Zohary: 13 (1972); Mendes: 27 (1978).

Tall perennial herbs with oblique or creeping rootstock, generally glandular and fragrant; stems usually erect. **Leaves** alternate, imparipinnate with 7–13 unequal, incised-serrate, petiolate leaflets; stipules large, adnate to base of petiole, deeply toothed. **Inflorescence** very often a terminal, spike-like raceme; pedicels bracteate at base, bibracteolate in middle. **Flowers** bisexual, without an epicalyx, small. **Calyx**: tube turbinate, with many hooked bristles or with 5 teeth below calyx lobes, sometimes constricted at throat; lobes 5, triangular, imbricate, connivent in fruit. **Petals** 5, imbricate, orbicular to oblong, longer than calyx lobes, deciduous, yellow. **Disc** annular, glandular, lining mouth of calyx tube, with thickened margins, sometimes closing mouth of calyx tube. **Stamens** (5)10–20, free, uniseriate, inserted on yellowish disc. **Gynoecium** of 2, rarely 3, free, sessile carpels; ovules solitary in each carpel, pendulous; styles terete, exserted; stigmas slightly dilated, 2-lobed. **Fruit** of 1- or 2-seeded achenes, included in hardened, persistent calyx tube which is beset near apex with a crown of hooked prickles. $x = 7$ (high polyploidy).

Species ± 15, occurring in temperate regions and on tropical mountains of northern hemisphere, mainly in North America, but ± 9 species in Europe and Asia; 2 in tropical and sthn Afr., Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

Alchemilla L. 3375000

Linnaeus: 123 (1953); Linnaeus: 58 (1754); Jussieu: 337 (1789); Kunth: 219 (1823); Candolle: 589 (1825); Endlicher: 1243 (1840); Harvey: 291 (1862); Hooker: 621 (1865); Focke: 43 (1894); Engler: 127 (1912); Burtt Davy: 318 (1932); Hauman & Balle: 1 (1936); Rothmaler: 111[23] (1937); Levyns: 443 (1950); Graham: 2 (1960); Mendes: 29 (1978); Hedberg: 575 (1986); Hedberg: 37 (1989).

Annual or perennial herbs; stems decumbent or erect, often arising from a basal leaf rosette. **Leaves** radical and cauline, alternate, circular, lobed, digitate or palmately partite; stipules foliaceous or membranous, ± adnate to base of petiole. **Inflorescences** axillary, few- to many-flowered corymbs, or sometimes in lax cymes, or flowers solitary, ebracteate, exceeding or ± hidden within stipules. **Flowers** bisexual, small, greenish. **Calyx**: tube urceolate, persistent, constricted at throat, 4- or 5-bracteolate; lobes 8–10 in 2 rows; outer epicalyx smaller, inner valvate. **Petals** 0. **Stamens** 1–4, inserted on mouth of calyx tube, alternating with calyx lobes. **Disc** with thickened margin nearly closing calyx tube. **Gynoecium** of 1–20 free carpels, sessile or subsessile, inserted at base of calyx tube; ovules solitary in each carpel, basal, pendulous; styles basal or ventral; stigma capitate. **Fruit** of 1 or 2 achenes included within membranous calyx tube.

Species ± 250, mostly in temperate areas and on tropical mountains, in South America, also in Africa, India and Australia; 16 in sthn Afr., mainly eastern summer-rainfall regions, Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

Cliffortia L. 3388000

Linnaeus: 1038 (1753); Linnaeus: 460 (1754); Jussieu: 337 (1789); Candolle: 595 (1825); Endlicher: 1245 (1840); Harvey: 292 (1862); Hooker: 624 (1865); Weimarck: 19 (1934); Weimarck: 168 (1948); Levyns: 444 (1950); Graham: 40 (1960); Mendes: 24 (1978).

Shrublets, shrubs or occasionally small trees, erect or procumbent; plants dioecious or monoecious. **Leaves** alternate or fasciculate, sessile or shortly petiolate, 1–3-foliolate, often appearing simple by reduction; leaflets entire, toothed or lobed; stipules triangular, acute, adnate to petiole and sheathing stem, rarely 0. **Inflorescence** a single flower in axil of unmodified to highly modified leaves, scattered or aggregated in specialised zones or capitate with both male and female flowers, or cones with female flowers only. **Flowers** unisexual (very rarely bisexual), sessile or pedicellate. **Male flowers** with 3 or 4 petaloid calyx lobes, usually green tinged with red or yellow, free or connate ± to centre, deciduous or persistent; petals 0; stamens 3–50, usually 8–20; anthers didymous; carpels 0. **Female flowers** with calyx lobes connate below into a ribbed, winged, hairy or smooth, urceolate tube which completely envelopes receptacle; gynoecium of 1–3 free carpels; ovules solitary in each carpel, pendulous; styles 1–3, long and filiform, exserted, or very short; stigmas lorate, slightly bent to tightly curved, margins serrate to widely fimbriate, pale yellow or maroon. **Fruit** usually a single achene, sometimes 2 or 3, in persistent receptacle.

Species ± 112; sthn Afr. (mostly Western Cape) with 2 extending into tropical Africa.

*__Cotoneaster__ Medik. 3333000

Medikus: 85 (1793); Lindley: 101 (1820); Kunth: 214 (1823); Candolle: 632 (1825); Endlicher: 1238 (1840); Hooker: 627 (1865); Focke: 21 (1894); Browicz: 72 (1968); Bailey & Bailey: 322 (1977); Meikle: 637 (1977); Klotz: 7 (1982); Hedberg: 41 (1989); Fryer & Hylmö: 426 (1995).

Deciduous or evergreen shrubs or small trees, erect or decumbent, unarmed, pubescent. **Leaves** alternate, entire, simple, coriaceous, often downy; stipules subulate, caducous. **Inflorescences** lateral and terminal cymes, a small corymb or occasionally flowers solitary. **Flowers** bisexual, small, shorter than 10 mm. **Calyx**: tube turbinate or campanulate; lobes 5, superior, short, persistent in fruit. **Petals** 5, suborbicular, erect or spreading, white, pink or red. **Stamens** 10–20, inserted at mouth of calyx tube. **Ovary** semi-inferior; carpels 2–5, adnate wholly, or by their backs only, to calyx tube; ovules 2, erect in each carpel; styles 2–5, free; stigma truncate. **Fruit** small, globose, somewhat succulent, red or black berries, crowned with persistent calyx tube, with mealy flesh, and with 2–5, 1-seeded, hard-walled pyrenes. $x = 17$ (polyploidy).

Species ± 70, mainly in the north temperate regions of Europe and Asia, particularly abundant in W China and the Himalaya region; several species have been widely grown as ornamentals for their decorative berries; 2 naturalised in sthn Afr., **Cotoneaster franchetii* Boiss. and **C. pannosus* Franch., Gauteng, Free State, KwaZulu-Natal and Eastern Cape.

*Crataegus L. 3345000

Linnaeus: 475 (1753); Linnaeus: 213 (1754); Jussieu: 335 (1789); Lindley: 105 (1820); Candolle: 626 (1825); Endlicher: 1239 (1840); Hooker: 626 (1865); Diapulis: 49, 68 (1933); Pojarkova: 437 (1939); Franco: 73 (1968); Zohary: 19 (1972); Bailey & Bailey: 329 (1977); Meikle: 635 (1977); Knees & Warwick: 439 (1995).

Small, much-branched trees or shrubs, mostly deciduous, often spiny. **Leaves** alternate, simple, margins entire, serrate, pinnatifid or variously lobed, petiolate; stipules usually conspicuous, serrate-laciniate, lanceolate, often leaf-like, caducous. **Inflorescences** corymbose or flowers rarely solitary; bracts and bracteoles present, caducous. **Flowers** bisexual. **Calyx**: tube campanulate or urceolate, mouth contracted; lobes 5, short, ± triangular; epicalyx 0. **Petals** 5, orbicular, inserted on throat of calyx tube, white, pink, or rarely red. **Stamens** 5–25; filaments thread-like. **Ovary** inferior, 1- or 2(3–5)-locular, 1–5-celled; carpels connate at least at base and wholly or partly adnate to calyx tube; ovules (1)2–5 in each carpel, pendulous; styles free. **Fruit** a small, globose or ovoid, red, yellow or black berry with umbilical disc and minute, marcescent lobes on top, usually with juicy flesh and 1–3, rarely 5, bony, 1- or 2-seeded pyrenes. $x = 16, 17$ (polyploidy).

Species ± 180, in north temperate regions of the Old World and ± 900 in North America; 2 escapes from cultivation in sthn Afr.: **Crataegus* x *lavallei* Henrique and **C. monogyna* Jacq., with records from Free State and Eastern Cape.

*Cydonia Mill. 3336000

Miller: [426] (1754); Jussieu: 335 (1789); Lindley: 97 (1820); Candolle: 638 (1825); Endlicher: 1236 (1840); Focke: 22 (1894); Terpó: 64 (1968); Bailey & Bailey: 352 (1977); Hedberg: 42 (1989).

Deciduous large shrubs or small trees, without thorns. **Leaves** simple, entire, petiolate; stipules linear. **Inflorescence** terminal and axillary. **Flowers** bisexual, large, solitary on short shoots. **Sepals** 5, reflexed, glandular-serrate, persistent. **Petals** 5, larger than sepals, white or pink. **Stamens** 15–25, in 1 row. **Ovary** inferior, carpels fused along inner side only, 5-locular; ovules many in each locule; styles 5, free, pubescent towards base. **Fruit** a large, obovate to subglobose pome, with leathery carpel wall; stone cells abundant. **Seeds** many. $x = 16, 17$.

Monotypic, native in Caucasia, N Iran; widely cultivated in temperate regions for its edible fruits (Quince): **Cydonia oblonga* Mill., an escape of cultivation, Free State.

*Duchesnea Sm. 3355000

Smith: 372 (1811); Focke: 33 (1894); Valentine: 48 (1968); Bailey & Bailey: 403 (1977).

Small perennial herbs with creeping stolons, rooting at nodes. **Leaves** palmately 3(–5)-foliolate, long petiolate; stipules lanceolate, adnate to base of petiole. **Flowers** bisexual, axillary, solitary. **Epicalyx** usually 5-lobed, sometimes 4-lobed, larger than calyx. **Calyx** 5-lobed. **Petals** 5, yellow. **Stamens** ± 20. **Gynoecium** of many free carpels, inserted on a convex receptacle; ovules solitary; style lateral, deciduous. **Fruit** of many, minute achenes, spread on surface of slightly enlarged, spongy, deciduous, bright red receptacle. **Seed** without endosperm. $x = 7$ (high polyploidy).

Species 6, Indo-Malayan region and the Far East (China and Japan); **Duchesnea indica* (Andr.) Focke, Yellow or Indian Strawberry, occurs as an escape under damp conditions and is becoming fairly widespread, especially in KwaZulu-Natal, also naturalised in Gauteng, Mpumalanga, Swaziland and Eastern Cape. Sometimes included in *Potentilla* L.

*Fragaria L. 3354000

Linnaeus: 494 (1753); Linnaeus: 218 (1754); Jussieu: 338 (1789); Kunth: 218 (1823); Candolle: 569 (1825); Endlicher: 1241 (1840); Hooker: 620 (1865); Focke: 33 (1894); Graham: 20 (1960); Tutin: 47 (1968); Bailey & Bailey: 484 (1977); Hedberg: 37 (1989); Romoleroux: 54 (1996).

Perennial, hairy, scapose herbs; rootstock with creeping stolons. **Leaves** trifoliolate, pinnate or unifoliolate, densely clustered in a basal rosette, petiolate; stipules adnate to base of petiole, often membranous and sheathing. **Inflorescences** (1)2–10-flowered cymes; bracts foliaceous. **Flowers** bisexual, proterogynous, bracteolate, honeyed. **Calyx**: tube ± saucer-shaped, inferior, persistent, 5-bracteolate; lobes 5, valvate in bud. **Petals** 5, deciduous, white or yellow. **Stamens** 10–30; anthers glabrous, rarely with scattered, short, straight hairs. **Gynoecium** of 10–80 free carpels; ovule solitary in each carpel, pendulous; styles ventral, persistent; stigma discoid. **Fruit** consisting of many, small, 1-seeded achenes covering the accrescent, juicy, succulent receptacle, turning red when ripe; achenes smooth. **Seed** ± ovoid; testa thin; endosperm 0. $x = 7$ (high polyploidy).

Species ± 12, northern temperate and subtropical regions, also in Central and South America, Hawaii and in the Himalayas; **Fragaria vesca* L., Wild Strawberry, occasionally occurs as an escape.

Geum L. 3365000

Linnaeus: 500 (1753); Linnaeus: (1754); Jussieu: 338 (1789); Candolle: 550 (1825); Endlicher: 1246 (1840); Harvey: 289 (1862); Hooker: 619 (1865); Focke: 36 (1894); Focke: 539 (1906); Romoleroux: 52 (1996).

Erect, rhizomatous, perennial herbs; roots sometimes pleasantly aromatic. **Leaves** radical, imparipinnate with terminal segments usually largest; cauline leaves few, often trifoliolate or bract-like; stipules adnate to petiole. **Inflorescence** a lax, terminal, 2–12-flowered cyme. **Flowers** bisexual, erect or nodding, honeyed. **Calyx**: tube saucer-shaped, persistent, with 5 bracteoles above its base; lobes 5, imbricate or valvate in bud. **Petals** 5, circular or obovate, longer than calyx, bright yellow. **Stamens** many, perigynous, inserted with petals; anthers glabrous. **Disc** lining receptacle smooth or grooved. **Gynoecium** of many free carpels on a columnar receptacle; ovules solitary in each carpel, pendulous; style filiform, straight or bent, elongating at maturity; stigma minute, punctiform. **Fruit** a cluster of 50–250 achenes borne on a cylindrical, dry receptacle, tipped with hardened, awn-like, hooked or curled persistent styles. **Seeds** rounded; testa thin. $x = 7$ (high polyploidy).

Species ± 40, mainly temperate and cold areas of the northern hemisphere, with a few species in the mountains of South America; 1 in sthn Afr.: *Geum capense* Thunb., in the eastern regions, Mpumalanga, KwaZulu-Natal, Lesotho and Eastern Cape.

Leucosidea Eckl. & Zeyh. 3379000

Ecklon & Zeyher: 265 (1836); Endlicher: 1244 (1840); Harvey: 289 (1862); Hooker: 622 (1865); Killick: t. 1566 (1969); Mendes: 22 (1978); Coates Palgrave: 208 (1981); Pooley: 116 (1993); Van Wyk & Van Wyk: 440 (1997).

A much-branched shrub or small tree, densely leafy and silky-villous. **Leaves** alternate, green or grey, aromatic, petiolate, imparipinnate; leaflets in 3 or 4 pairs, with minute leaflets between, incised, toothed, sessile; stipules adnate to petiole. **Inflorescence** a densely aggregated, terminal spike, with shortly pedunculate flowers. **Flowers** bisexual. **Calyx**: tube obconic, villous, ± constricted in throat, persistent; lobes 10–12 in 2 rows, valvate, outer ovate, inner linear-lanceolate, longer than

outer. **Petals** 5 (or 6), ± obovate, deciduous, yellowish green or yellow. **Disc** lining calyx tube annular and nearly closing mouth of calyx tube, villous at mouth. **Stamens** 10–12, inserted on disc; anthers didymous, almost versatile. **Gynoecium** of 2–4 free carpels; ovules solitary in each carpel, pendulous; styles terete, exserted; stigmas lateral, channelled, hooked. **Fruit**: membranous achenes enclosed in receptacle.

Monotypic: *Leucosidea sericea* Eckl. & Zeyh. (Oldwood or Ouhout), Zimbabwe to Northern Province, Gauteng, Mpumalanga, Free State, KwaZulu-Natal, Lesotho and Eastern Cape; usually confined to stream banks and kloofs at high altitudes, sometimes invades overgrazed and disturbed areas.

Potentilla L. 3356000

Linnaeus: 495 (1753); Linnaeus: 9 (1754); Jussieu: 338 (1789); Nestler: 1 (1816); Kunth: 215 (1823); Candolle: 571 (1825); Endlicher: 1242 (1840); Harvey: 288 (1862); Hooker: 620 (1865); Focke: 34 (1894); Burtt Davy: 318 (1932); Friedrich-Holzhammer: 1 (1968); Zohary: 9 (1972); Bailey & Bailey: 904 (1977); Hedberg: 36 (1989).

Perennial, rarely annual herbs or undershrubs, erect or creeping with stoloniferous branches. **Leaves** alternate, compound; leaflets solitary, digitate or ternate, often lobed or further divided; stipules adnate to base of petiole. **Inflorescences** usually dense, terminal cymes; flowers rarely solitary and axillary; bracteate. **Flowers** usually bisexual. **Calyx**: tube concave or almost flat, persistent; lobes (4)5(6), erect or spreading, triangular-ovate, valvate; epicalyx present, green as calyx. **Petals** (4)5(6), obovate, circular or linear-spathulate, commonly yellow, occasionally white, pink, red or dark purple. **Stamens** 10–20(–30), perigynous, inserted with petals; anthers glabrous. **Disc** annular or lining receptacle. **Gynoecium** usually of many carpels, rarely few–1, inserted on convex or conical, hairy or glabrous receptacle; ovules solitary in each carpel, pendulous; styles long-filiform, caducous, ± lateral; stigma truncate or capitate. **Fruit** an apocarpium composed of many 1-seeded achenes on a dry or spongy receptacle enclosed by accrescent calyx; achenes often smooth. **Seed** semi-globose; testa thin. $x = 7$ (aneuploids, high polyploidy).

Species ± 500, mainly temperate to arctic in the northern hemisphere; 1 regarded as probably indigenous in sthn Afr.: *Potentilla supina* L., Namibia, North-West, Gauteng, Free State, KwaZulu-Natal and Northern Cape.

Prunus L. 3396000

Linnaeus: 473 (1753); Linnaeus: 213 (1754); Jussieu: 341 (1789); Kunth: 241 (1823); Hooker: 609 (1865); Zohary: 24 (1972); Bailey & Bailey: 918 (1977); Meikle: 607 (1977); Hedberg: 41 (1989); Pooley: 116 (1993); Van Wyk & Van Wyk: 152 (1997).

Prunus subgen. *Laurocerasus* Kalkm.: 25 (1965). *Pygeum* Gaertn.: 218, t. 46 (1788); Koehne: 177 (1913); Graham: 45 (1960).

Deciduous or evergreen trees or shrubs; buds covered with imbricate scales. **Leaves** alternate or clustered, entire or glandular-serrulate, petiolate, usually with 2 or sometimes more glands at base; stipules small, usually free, sometimes intrapetiolarly connate, caducous. **Inflorescences** usually racemes, solitary in axils of leaves, with more than 10 flowers; bracts small, lower ones often empty and tripartite or tridentate, caducous. **Flowers** bisexual or occasionally a few male with ± reduced ovaries present. **Calyx**: tube obconical, urceolate or cylindrical, with an adnate glandular disc inside; lobes 5, caducous, imbricate. **Petals** 5, white or pink. **Stamens** 10–20(–85), perigynous, free, arising with petals in throat of calyx tube; filaments free; anthers often glabrous. **Ovary** superior, consisting of 1 carpel, 1-locular, sessile; ovules 2, collateral, pendulous; style elongate; stigma peltate, capitate, or truncate. **Fruit** an ovoid to globose drupe; mesocarp fleshy-juicy; endocarp very hard, ovoid-globular, wrinkled or smooth, 1- or 2-seeded. **Seed** pendulous; testa membranous; pericarp dry. $x = 8$ (aneuploids, high polyploidy).

Species ± 200, fairly cosmopolitan in temperate regions, particularly abundant in North America, E Asia, and S Europe, containing many important fruit trees, like Plum, Peach, Apricot, etc.; 1 indigenous in sthn Afr.: *Prunus africana* (Hook.f.) Kalkm., from tropical Africa, Zimbabwe into the Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Lesotho and Eastern Cape.

***Pyracantha** M.Roem. 3333010

Roemer: 219 (1847); Ball: 73 (1968); Browicz: 132 (1972); Bailey & Bailey: 930 (1977); Knees: 438 (1995).

Evergreen shrubs, usually spiny; buds small, softly hairy. **Leaves** alternate, simple, entire, shortly petiolate; stipules minute, caducous. **Inflorescence** a compound corymb. **Flowers** bisexual, small. **Calyx**: tube short; lobes 5, triangular. **Petals** suborbicular, often with a notched apex, white or creamy. **Stamens** 20; anthers yellow. **Ovary** half-inferior; carpels 5, free on central axis, joined on dorsal side for ± half their length to calyx tube; ovules 2 per carpel; styles free. **Fruit** small, globose, red, orange or yellow berries, crowned by persistent calyx lobes; pyrenes 5. $x = 17$.

Species ± 9, native of SE Europe, Caucasia, NW Iran and China; cultivated for its ornamental berries; 3 naturalised in sthn Afr., Gauteng, Free State, KwaZulu-Natal and Eastern Cape.

***Pyrus** L. 3338000

Linnaeus: 479 (1753); Linnaeus: 214 (1754); Jussieu: 335 (1789); Terpó & Franco: 65 (1968); Bailey & Bailey: 931 (1977); Meikle: 631 (1977); Hedberg: 43 (1989); Knees: 406 (1995).

Deciduous shrubs or trees; often spiny on lower branches or when young; buds with overlapping scales. **Leaves** alternate, simple, entire or serrate, rarely lobed, margin often with forward-pointing teeth, inrolled in bud, petiolate; stipules caducous. **Inflorescences** umbel-like racemes or corymbose. **Flowers** bisexual, appearing with or before leaves. **Calyx**: tube turbinate or globose, accrescent; epicalyx absent. **Petals** 5, shortly clawed, rounded to broadly oblong, white. **Stamens** 15–30; anthers dehiscing outwards, usually red. **Gynoecium** of 2–5 carpels, connate to and enclosed within receptacle, walls becoming cartilaginous at maturity; ovules 2 per locule; styles 2–5, free or connate at base. **Fruit** a pome, pyriform, turbinate or globose, brownish or greenish, sometimes yellowish or reddish when fully ripe, flesh juicy or woody, with grit cells. **Seeds** usually with a cartilaginous testa, black or brownish black. $x = 17$ (aneuploids, polyploidy).

Genus with ± 25 species from Europe to E Asia, south to N Africa. Ornamental trees with conspicuous white flowers and colourful autumn foliage; 1 species an escape from cultivation: **Pyrus communis* L., the Wild Pear.

***Rosa** L. 3389000

Linnaeus: 491 (1753); Linnaeus: 217 (1754); Jussieu: 335 (1789); Kunth: 222 (1823); Candolle: 592 (1825); Endlicher: 1240 (1840); Hooker: 625 (1865); Zohary: 15 (1972); Bailey & Bailey: 947 (1977); Nilsson: 34 (1989); Thulin: 339 (1993).

Erect, stoloniferous or climbing shrubs, deciduous or evergreen; stems and branches usually with hooked prickles and/or thorns. **Leaves** alternate, imparipinnate; leaflets serrate; stipules usually adnate to petiole for most of their length, sheathing with free auricles, persistent. **Inflorescence** corymbose, paniculate, umbellate clusters or flowers solitary. **Flowers** bisexual, large, terminal, rarely bracteate. **Calyx**: tube globose, ovoid, urceolate or ventricose, constricted at throat by a glandular ring, persistent; lobes (4)5(6), caducous or persis-

tent, foliaceous, spreading or reflexed, entire or pinnatifid, imbricate in bud. **Petals** (4)5(6), usually obovate, tip often notched, spreading, white, red, pink or yellow. **Stamens** 30–200, in several whorls, inserted at throat of calyx tube; filaments free, thread-like. **Disc** lining calyx tube with thickened margin all but closing the mouth, silky. **Gynoecium** of many free carpels, sunk in calyx tube, often pubescent; ovules 1 or 2 per carpel, pendulous; styles subterminal, persistent, free or connate in a column protruding through opening of receptacle; stigma thickened. **Fruit** composed of many coriaceous or bony, often hairy, 1-seeded achenes, included in persistent, fleshy and coloured calyx tube. $x = 7$ (high polyploidy).

Species ± 100, mainly in temperate but also in subtropical areas of the northern hemisphere. Some species and many cultivars are grown as ornamentals; 2 occur widely as escapes in sthn Afr., North-West, Mpumalanga, Free State, KwaZulu-Natal, Lesotho and Eastern Cape.

Rubus L. 3353000

Linnaeus: 492 (1753); Linnaeus: 218 (1754); Jussieu: 338 (1789); Kunth: 219 (1823); Candolle: 556 (1825); Endlicher: 1241 (1840); Harvey: 286 (1862); Hooker: 616 (1865); Gustafsson: 177 (1938); Levyns: 430 (1950); Graham: 21 (1960); Henderson & Anderson: 168 (1966); Heslop-Harrison: 7 (1968); Kupicha: 12 (1978); Hedberg: 873 (1986); Hedberg: 31 (1989).

Shrubs, rarely herbs, mostly scrambling with ± arching sterile shoots, carrying ± erect flowering branches, armed with prickles and various amounts of hair and stalked glands. **Leaves** alternate, simple or compound, lobed, 3–5-foliolate, pinnate or digitate; leaflets with serrated margins, glabrous or densely hairy, petiolate; stipules filiform, linear or obovate, free or adnate to base of petiole. **Inflorescences** terminal or axillary, panicles or corymbs, rarely flowers solitary; bracteoles 0. **Flowers** bisexual, slightly perigynous. **Calyx**: tube (receptacle) broad; lobes 5, equal, longer than calyx tube, persistent. **Petals** 5, alternating with sepals, inserted on margins of perigynous cup, sometimes 0, white, pink or red. **Stamens** many, rarely definite, inserted in mouth of calyx tube. **Disc** lining tube of receptacle. **Gynoecium** of many carpels inserted on a spongy elongate receptacle, developing into drupelets; ovules 2 in each carpel (1 often subaborted), collateral, pendulous; style subterminal, filiform; stigma simple or capitate. **Fruit** an aggregation of 1-seeded, succulent drupelets crowded upon a dry or spongy, conical, enlarged, sweet and edible receptacle. **Seed** ovoid-globose, pendulous; testa thin. $x = 7$ (high polyploidy).

Species ± 250, mainly cooler areas of the northern hemisphere, 17 in sthn Afr., some introduced and naturalised, Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape. All fruits are edible.

*Sanguisorba L. 3381000

Linnaeus: 116 (1753); Linnacus: 146 (1754); Gaertner: 161, t. 32 (1788) (*Pimpinella*); Jussieu: 336 (1789); Candolle: 593 (1825); Endlicher: 1244 (1840); Focke: 44 (1894); Nordborg: 5 (1966); Nordborg: 1 (1967); Zohary: 14 (1972).

Poterium L.: 994 (1753) in part; Bailey & Bailey: 906 (1977). *Poteridium* Spach: 43 (1846).

Perennial or rarely annual herbs or shrubs, with erect or ascending stems, unarmed, ± hairy. **Leaves** basal or alternate, petiolate, imparipinnate; pinnae serrated; stipules conspicuous, sheathing, adnate to petiole. **Inflorescences** densely capitate or spicate at ends of usually long slender and ± branched stems. **Flowers** bisexual or occasionally upper flowers in each inflorescence pistillate, small. **Calyx**: tube turbinate, mouth contracted, persistent, sometimes 4-angled and tuberculate; bracts and 2 membranous bracteoles at base, sometimes 0; lobes 4(5 or 6), caducous, petaloid, imbricate, greenish, whitish or reddish, spreading. **Petals** 0. **Stamens** 4–30, inserted at mouth of calyx tube; filaments elongate, slender, exserted; anthers short. **Disc** lining calyx tube and closing its mouth. **Gynoecium** of 1–3 free carpels; ovules solitary in each, pendulous; style filiform, long or short; stigmas brush-like, reddish. **Fruit** an achene, usually solitary, enclosed in dry, corky, angular or ± winged, tuberculate calyx tube. $x = 7$ (aneuploids, high polyploidy).

Species ± 10, mainly temperate regions of the northern hemisphere; **Sanguisorba minor* Scop. subsp. *muricata* Briq., partly naturalised in sthn Afr., Gauteng, Mpumalanga and Free State.

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Rubiaceae

(Asteridae—Rubiales)

Compiled by E. Retief & O.A. Leistner

Trees, shrubs, annual or perennial herbs, sometimes spiny or prickly; raphides (needle-shaped calcium oxalate crystals) present or 0. **Leaves** opposite or whorled, sessile or petiolate, simple, usually entire. **Stipules** interpetiolar (sometimes reduced to an interpetiolar line), sometimes intrapetiolar, often basally fused into a stipular sheath, entire or divided into lobes or fimbriae, often tipped or separated by mucilaginous hairs known as colleters. **Flowers** bisexual, rarely unisexual, usually regular, quite often heterostylous with 2 or rarely 3 forms (di-, trimorphic); rarely solitary, mostly in various terminal or axillary, basically cymose inflorescences. **Calyx** gamosepalous, (3)4- or 5(–8)-lobed, cup-shaped or tubular, entire, toothed, or lobed, sometimes obsolete, sometimes 1 or more lobes foliaceous. **Corolla** gamopetalous, (3)4- or 5(10)-lobed, glabrous or hairy outside and variously hairy within; tube campanulate, funnel-shaped, cylindric, rarely urceolate or saucer-shaped; lobes usually equal, shorter or longer than tube, often reflexed, valvate, contorted or sometimes imbricate. **Disc** various, sometimes 0. **Stamens** as many as and alternating with corolla lobes, rarely fewer, arising in corolla tube; filaments sometimes 0; anthers 2-thecous, basi- or dorsifixed, usually dehiscing by longitudinal slits, often apiculate, sometimes sagittate, sometimes hairy. **Ovary** inferior, rarely half-inferior, 1–10-locular; placentation axile or (in some Gardenieae) parietal; ovules 1–many in each locule, erect, basal or horizontal; style either simple, usually long and narrow and apically divided into 2 or more linear to clavate stigmatic lobes; or ending in an enlarged, variously shaped stigmatic knob (pollen presenter); or ± 0 and with (1)2 long, hairy stigmas (in wind-pollinated Anthospermeae). **Fruit** a drupe, berry or capsule, sometimes crowned with persistent sepals, or indehiscent, or breaking up into cocci. **Seeds** small to fairly large, ornamented to smooth, sometimes winged; embryo usually straight and embedded in oily endosperm.

Genera 630, species 10 200, cosmopolitan but especially tropics and warm regions; sthn Afr.: genera 61, species 228.

Jussieu: 198 (1789); Candolle: 341 (1830); Sonder: 1 (1865); Hooker: 7 (1873); Hiern: 3 (1877); Schumann: 1 (1891); Phillips: 718 (1951); Verdcourt: 209 (1958); Launert: 1 (1966); Dyer: 602 (1975); Verdcourt: 1 (1976).

Classification of Rubiaceae

This scheme is largely adapted from Robbrecht (1988) but is based entirely on local material. Tribe **Knoxieae** (*Pentanisia*) is placed in **Rubioideae**, following Bridson (1998).

I. Subfamily CINCHONOIDEAE
(Shrubs or trees. Stipules entire or bifid. Raphides 0. Corolla lobes imbricate, contorted or valvate. Stylar pollen presentation often present. Heterostyly frequent. Ovules many (few) per locule. Fruit dry (capsule) or slightly fleshy. Seeds sometimes winged.):
1. Tribe **Cinchoneae** (Inflorescence dense, many-flowered. Corolla lobes valvate or contorted. Fruit a capsule. Seeds winged.): *Crossopteryx*, *Hymenodictyon*

2. Tribe **Naucleeae** (Flowers in pedunculate spherical heads. Corolla lobes imbricate. Fruit small capsules, clustered in hard, spherical heads. Seeds not winged.): *Breonadia*
3. Tribe **Isertieae** (Flowers solitary or in lax terminal cymes. Corolla lobes imbricate. Fruit ± fleshy, with many angular seeds. Stipules 2-lobed.): *Heinsia*

II. Subfamily IXOROIDEAE

(Shrubs or trees. Stipules entire or with an awn. Raphides 0. Stylar pollen presentation mostly present. Heterostyly rare. Corolla lobes contorted. Ovules many (few) per locule. Fruit mostly fleshy, sometimes ± dry with many seeds embedded in placental pulp.):

1. Tribe **Gardenieae**
   a. Subtribe **Gardeniinae** (Stipules ovate to triangular, often apiculate. Flowers often large. Fruit mostly large, dry-walled with many seeds embedded in pulp.): *Burchellia*, *Catunaregam*, *Coddia*, *Gardenia*, *Hyperacanthus*, *Mitriostigma*, *Oxyanthus*, *Rothmannia*
   b. Subtribe **Diplosporinae** (Stipules overtopped by 2 awns. Flowers relatively small. Fruit mostly small with seeds not embedded in pulp.): *Sericanthe*, *Tricalysia*
2. Tribe **Pavetteae** (Leaves often with bacterial nodules. Stipules partly to ± completely connate, mostly long-acuminate to awned. Pollen presenter ± fusiform, entire. Fruit ± fleshy, mostly small.): *Leptactina*, *Pavetta*, *Tarenna*
3. Tribe **Coffeae** (Stipules very shortly connate, apiculate. Style filiform, with 2 linear, divergent arms. Fruit a small drupe. Seeds with a deep ventral groove: 'coffee beans'.): *Coffea*
4. Tribe **Octotropideae** (Hypobathreae) (Stipules triangular to ovate, sometimes acuminate, ± free. Pollen presenter ± clearly developed, if bifid then usually coherent except at apex. Fruit ± fleshy, pericarp often with fingerprint-like pattern.): *Feretia*, *Kraussia*

III. Subfamily ANTIRHEOIDEAE

(Shrublets, shrubs, sometimes scandent perennial herbs with woody rootstock, or small trees. Raphides 0. Stipules entire. Corolla lobes mostly valvate, rarely imbricate or contorted. Ovules 1 per locule, pendulous. Stylar pollen presentation mostly present. Fruit a drupe with pyrenes.):

1. Tribe **Vanguerieae** (Corolla mostly 5-lobed, valvate. Inflorescence always axillary. Ovary 2–12-locular. Stigma cylindric or capitate. Fruit fleshy with several pyrenes. Widespread, especially in eastern parts.): *Ancylanthos*, *Canthium*, *Eriosemopsis*, *Fadogia*, *Keetia*, *Lagynias*, *Pachystigma*, *Plectroniella*, *Psydrax*, *Pygmaeothamnus*, *Pyrostria*, *Rytigynia*, *Vangueria* (including *Tapiphyllum*), *Vangueriopsis*
2. Tribe **Guettardeae** (Corolla 4–9-lobed, imbricate. Inflorescence terminal or axillary. Ovary 4–9-locular. Fruit fleshy, with 4–9 pyrenes. Coastal dune scrub in N KwaZulu-Natal): *Guettarda*
3. Tribe **Alberteae** (Corolla 5-lobed, contorted to left, ± irregular. Inflorescence terminal on lateral branches. Ovary 2-locular. Fruit small, crowned with enlarged, brilliantly coloured calyx lobes. KwaZulu-Natal and N Eastern Cape.): *Alberta*
4. Tribe **Cephalantheae** (Corolla 5-lobed, imbricate. Flowers and small fruit crowded in dense, globose heads. Northern Province to KwaZulu-Natal.): *Cephalanthus*

IV. Subfamily RUBIOIDEAE

(Mostly herbaceous, sometimes dwarf shrubs, shrubs or trees. Raphides present. Stipules frequently bifid or fimbriate. Corolla lobes valvate. Heterostyly very common. Stylar pollen presentation mostly absent. Ovules 1, erect, rarely pendulous, or many, rarely few per locule. Fruit dry or fleshy.):

1. Tribe **Hedyotideae** (Annual or perennial herbs, subshrubs, rarely shrubs. Stipules usually fimbriate. Ovules many, rarely few per locule.): *Agathisanthemum*, *Amphiasma*, *Carphalea*, *Conostomium*, *Kohautia*, *Oldenlandia*, *Otiophora* (perhaps better placed in a tribe of its own), *Pentas*, *Pentodon*
2. Tribe **Spermacoceae** (Herbaceous. Stipules fimbriate. Flowers mostly in small, dense, axillary clusters. Ovules 1 per locule. Fruit dry, dehiscent into mericarps.): **Diodia*, *Phylohydrax*, **Richardia*, *Spermacoce*
3. Tribe **Knoxieae** (Herbaceous. Stipules fimbriate. Inflorescence terminal. Corolla mostly blue. Ovules 1 per locule, pendulous. Fruit dry, dehiscent into mericarps.): *Pentanisia*
4. Tribe **Rubieae** (Herbaceous, often adhesive due to prickles. Leaves and stipules similar, in pseudowhorls of 4–8. Flowers terminal or axillary. Ovules 1 per locule, erect. Fruit dry or fleshy.): *Galium*, *Rubia*, **Sherardia*
5. Tribe **Anthospermeae** (Perennial herbs to shrubs. Stipules mostly setose. Flowers mostly unisexual, wind-pollinated. Style ± 0, stigmas (1)2, long, feathery. Ovules 1 per locule, erect. Fruit dry, breaking into mericarps.): *Anthospermum*, *Carpacoce*, *Galopina*, *Nenax*
6. Tribe **Paederieae** (Evil-smelling shrublets to shrubs, sometimes climbing. Stipules entire. Ovule 1 per locule, erect. Fruit dry, breaking into 2 or 3 pyrenes or mericarps.): *Gaillonia*, *Paederia*
7. Tribe **Psychotrieae** (Shrubs or trees. Stipules entire. Leaves often drying reddish brown, either with domatia or bacterial nodules. Stipules entire. Ovule 1 per locule, erect. Fruit small, drying reddish to black, sometimes strongly ribbed.): *Psychotria*

Key to genera

(Genera comprising plants of different habit have been included in more than one key—adapted from Bridson 1998.)

1a Herbs or subshrubs (if climbing or scandent see Key 3); corolla lobes always valvate; raphides present; if raphides absent and inflorescences clearly axillary, go to Key 2 ..... **Key 1**

1b Plants woody, or sometimes with ± herbaceous shoots from a woody rootstock (pyrophytes); corolla lobes valvate, contorted or sometimes imbricate; raphides present or absent:

2a Climbing and/or scandent plants ..... **Key 3**

2b Plants not climbing, but sometimes scrambling:

3a Plants subshrubby to shrubby, or occasionally with ± herbaceous shoots from a woody or rhizomatous rootstock, with the herbaceous shoots 0.05–2 m tall and mostly burnt off by annual fires (pyrophytes) ..... **Key 2**

3b Shrubs or trees (0.75–)2–20 m tall ..... **Key 4**

Key 1 — **Herbaceous**

1a Leaves and stipules similar, in whorls of 4–8; herbs and herbaceous climbers with ± rotate corollas (but tubular in **Sherardia*); ovules solitary in each locule; fruits bilobed, indehiscent; plants often adhesive due to prickles and harsh hairs (*Rubieae*):

2a Calyx with 4–6 distinct teeth; flowers in small terminal involucrate heads; corolla tube cylindrical ..... ***Sherardia**

2b Calyx limb reduced to a rim; inflorescence not involucrate; corolla rotate:

3a Petioles very well developed, 10–80 mm long; corolla usually 5-merous ..... **Rubia**

3b Petioles very short or leaves sessile; corolla usually 4-merous ..... **Galium**

1b Leaves clearly different from the stipules, opposite, or less often in whorls of 3(5); corolla mostly clearly tubular:

4a Ovules (or seeds) 2–many in each locule:

5a Flowers mostly 5-merous; leaf blades usually broad and usually with very obvious lateral and tertiary venation:

6a Leaves uninerved, mostly fairly small; decumbent herbs of wet places with small, white or blue flowers ± 5 mm long, in very lax elongated axillary cymes ..... **Pentodon**

6b Leaves larger, pinnately nerved; erect herbs with terminal, capitate or lax, much branched complicated cymes ..... **Pentas**

5b Flowers mostly 4-merous; leaf blades frequently narrow and uninerved or with lateral nerves obscure:

7a Anthers and stigmas included, the latter always overtopped by the former; corolla tube narrowly cylindrical ..... **Kohautia**

7b Anthers and/or stigmas exserted or if included then anthers overtopped by stigmas; corolla tube cylindrical or funnel-shaped:

8a Corolla tube at least 15–20 mm long, cylindrical; anthers included and style exserted; flowers not heterostylous.. ..... **Conostomium**

8b Corolla tube always shorter than 20 mm, cylindrical or funnel-shaped, sometimes with included anthers and exserted style but then usually heterostylous:

9a Stems usually unbranched, strict, erect; plant rush-like; leaves linear or filiform; stipule sheath tubular, truncate or with 2 minute teeth; seeds dorsiventrally flattened ..... **Amphiasma**

9b Stems usually branched, lax or erect; plant not rush-like, even if leaves are linear; stipule sheath scarcely tubular; seeds angular, subglobose or ovoid trigonous:

10a Capsule opening both septicidally and loculicidally; erect perennial herbs or subshrubs; inflorescences many-flowered, corymbose or subglobose heads; seeds ovoid-trigonous ..... **Agathisanthemum**

10b Capsule opening loculicidally, annual or perennial herbs, erect or prostrate, rarely subshrubs; inflorescences various but seldom many-flowered; seeds angular or subglobose ..... **Oldenlandia**

4b Ovules (or seeds) solitary in each locule, or flowers male:

11a Style topped by a pollen presenter which is globose, cylindrical or mitriform and often ridged and 2–several-lobed at the apex when mature; flowers never heterostylous; inflorescences always axillary; fruit with 2–several woody pyrenes ..... **Vanguerieae** (go to Key 5 on p. 481)

11b Style lacking a pollen presenter; flowers frequently heterostylous; fruit occasionally with pyrenes (but then inflorescence terminal) or sometimes with 1 many-seeded stone (putamen):

12a Style ± 0; stigmas 2 or 1, feathery, long-exserted; flowers wind-pollinated:

13a Fertile carpel and feathery stigma usually 1, calyx lobes mostly large and leaf-like ..... **Carpacoce**

13b Fertile carpels and feathery stigmas 2; calyx lobes mostly smaller than leaves to subobsolete:

14a Inflorescence made up of axillary, sessile flower clusters; fruit supported by a carpophore ..... **Anthospermum**

14b Inflorescence terminal, paniculate to thyrso-paniculate; fruit never supported by a carpophore ..... **Galopina**

12b Style well developed, ending in 2 style arms:

15a Corolla blue to purple; ovules pendulous from near apex of locule ..... **Pentanisia**

15b Corolla white to pinkish; ovule erect from the locule base, or attached near the middle of the septum:

16a Corolla tube filiform or narrowly funnel-shaped; calyx lobes unequal, 1 or more enlarged; flowers not heterostylous, both stamens and style exserted; ovary bicarpellate, but often with one carpel reduced in fruit.... ..... **Otiophora**

16b Corolla tube not markedly narrow; calyx lobes usually equal; flowers frequently heterostylous; ovary 2–5-locular; carpel reduction unusual in fruit:

17a Ovary 3(4)-locular; stigma 3(4)-lobed; fruit with 3(4) cocci ..... ***Richardia**

17b Ovary 2-locular; stigmas 2-lobed or capitate; fruits indehiscent, capsular with 2 valves, with 2 cocci or circumscissile:

18a Succulent creeping plant of the seashore with imbricate leaves; stipules quite broad, sheathing, with very short processes; stems rooting at the nodes; fruits indehiscent; seeds not lobed ..... **Phylohydrax**

18b Plant not a littoral succulent; leaves not imbricate; stipules with longer processes; stems not rooting at the nodes; fruits dividing into cocci, or capsular; seeds lobed:
19a Fruit separating into 2 indehiscent mericarps ..... *Diodia
19b Fruit a 2-valved capsule ..... Spermacoce

Key 2 — Perennial herbs, sometimes woody at base, with woody rootstock (pyrophytes or geofrutices)

1a Style ± 0; stigmas 2, or sometimes 1, long, feathery; flowers wind-pollinated:
2a Fertile carpel and feathery stigma usually 1; calyx lobes mostly large and leaf-like ..... Carpacoce
2b Fertile carpels and feathery stigmas usually 2; calyx lobes mostly smaller than leaves to subobsolete:
3a Inflorescence terminal, paniculate to thyrso-paniculate; leaves relatively large, petiolate ..... Galopina
3b Inflorescence of axillary, ± sessile flower clusters; leaves often ± ericoid, often without distinct petiole:
4a Distinctly woody, many-stemmed dioecious dwarf shrubs; leaves needle-like, mostly decussate; inflorescence few-flowered, reduced ..... Nenax
4b Tall shrubs to perennial herbs, similar to above but not in same combination ..... Anthospermum
1b Style well developed, ending in 2 style arms or a pollen presenter:
5a Style divided into 2 lobes:
6a Corolla blue to purple ..... Pentanisia
6b Corolla white to yellow to reddish:
7a Ovules (or seeds) many per locule ..... Pentas
7b Ovules (or seeds) 1 per locule:
8a Calyx with 1–3 foliaceous lobes, the others minute; corolla tube narrowly cylindric; stipules fimbriate ..... Otiophora
8b Calyx lobes ± similar; corolla tube, if cylindrical, not markedly narrow; stipules ± entire ..... Psychotria
5b Style topped with a globose, cylindrical or mitriform, often ridged pollen presenter:
9a Ovary 2-locular:
10a Leaves glabrous or with sparse bristly hairs on both surfaces ..... Pygmaeothamnus
10b Leaves densely villous-tomentose ..... Eriosemopsis
9b Ovary 3–8-locular, a few flowers sometimes with 2-locular ovaries:
11a Leaves mostly in whorls of 3–5; calyx limb truncate, dentate or 5–9-lobed ..... Fadogia
11b Leaves in pairs, rarely in whorls of 3; calyx lobes 5, linear to lanceolate-triangular:
12a Small subshrubs up to 250 mm high; leaves glabrous or with seta-like hairs on both sides; corolla tube shorter than 15 mm ..... Pachystigma
12b Larger subshrubs, usually higher than 300 mm; leaves velvety with silky hairs; corolla tube 15–25 mm long ..... Ancylanthos

Key 3 — Climbing or scandent (herbaceous or woody)

1a Leaves and stipules similar, in whorls of 4–8; herbaceous climbers, often adhesive due to prickles or rough hairs:
2a Leaves petiolate; corolla mostly 5-merous; fruit fleshy, glabrous ..... Rubia
2b Leaves ± sessile; corolla mostly 4-merous; fruit dry, glabrous or hairy ..... Galium
1b Leaves clearly different from stipules, opposite or in whorls of 3:
3a Plant evil-smelling; leaves paired or in whorls of 3, long-petiolate and cordate at the base; fruits flattened, the outer pericarp falling off to expose 2 compressed, winged pyrenes attached by long filiform stalks ..... Paederia
3b Plant not evil-smelling; leaves and fruit not as above:
4a Inflorescences axillary; pollen presenter ovoid, narrowly winged ..... Keetia
4b Inflorescence terminal, sometimes with additional axillary inflorescences near apex of main stem; pollen presenter narrowly spindle-shaped to ellipsoid:
5a Ovules/seeds many, seeds winged; fruit a capsule; pollen presenter ellipsoid ..... Hymenodictyon
5b Ovules/seeds 1 to several, seeds with a hilar cavity, not winged; fruit scarcely fleshy, globose; pollen presenter narrowly spindle-shaped ..... Tarenna

Key 4 — Shrubs or trees

1a Flowers in globose or capitate heads:
2a Inflorescence heads perfectly spherical:
3a Leaves paired; fruits subsucculent, clustered in spherical heads resembling a small strawberry ..... Cephalanthus
3b Leaves usually (3)4-whorled; fruits small capsules clustered in hard heads ..... Breonadia
2b Inflorescence heads not perfectly spherical:
4a Corolla white; style ± twice as long as corolla ..... Pavetta
4b Corolla orange to red; style only slightly longer than corolla ..... Burchellia
1b Flowers solitary or in lax to compact or spike-like inflorescences:
5a Calyx lobes (at least 2) strongly accrescent and brightly coloured in fruit:
6a Flowers and accrescent calyx lobes white ..... Carphalea
6b Flowers and accrescent calyx lobes bright red ..... Alberta
5b Calyx lobes less markedly and more equally accrescent and less strikingly coloured:
7a Style ± 0; stigmas 2 or 1, feathery, long-exserted; flowers wind-pollinated:
8a Fertile carpel and feathery stigma usually 1; calyx lobes mostly large and leaf-like ..... Carpacoce

8b Fertile carpels and feathery stigmas usually 2; calyx lobes mostly smaller than leaves to subobsolete:
9a Distinctly woody, many-stemmed dioecious dwarf shrubs; leaves needle-like, mostly decussate; inflorescence few-flowered, reduced ..... **Nenax**
9b Tall shrubs to perennial herbs, similar to above but not in same combination ..... **Anthospermum**
7b Style well developed, ending in 2 style arms or a pollen presenter:
10a Gynodioecious, evil-smelling shrubs or dwarf shrubs ..... **Gaillonia**
10b Flowers mostly bisexual; plants not evil-smelling:
11a Small tree or shrub growing in the littoral zone just above high tide level, the stems covered with large leaf scars; leaves large, crowded at the ends of the branchlets; calyx limb truncate; corolla white, salver-shaped, velvety outside, the tube ± 25 mm long with 4–9 lobes; ovary 4–9-locular; fruit globose, fibrously woody, up to 35 mm in diameter, containing one multi-seeded stone ..... **Guettarda**
11b Not growing in the littoral zone, or if so then calyx limb, corolla, fruit and habit not as above:
12a Style 0.6–3.0 mm long, ending in 2 arms or lobes 0.3–1.0 mm long; flowers heterostylous; fruit fleshy, subglobose, 5–7 mm long ..... **Psychotria**
12b Style apex mostly thickened or otherwise adapted to secondary pollen presentation; flowers mostly homostylous; combination of characters not as above:
13a Corolla lobes valvate; style topped with a globose, cylindrical or mitriform pollen presenter, often ridged; pollen presenter 2- to several-lobed at apex when mature, hollow with style attached internally or occasionally with style attached at the base; flowers never heterostylous; locules 2–10; pyrene walls woody or sometimes crustaceous; inflorescences always axillary (with flower(s) in both axils of a node)..... **Vanguerieae** (go to Key 5 on p. 481)
13b Corolla lobes contorted or imbricate, or if valvate then pollen presenter not as above or flowers heterostylous; locules (1)2, rarely several to many; if the fruit is a pyrene then walls scarious to crustaceous; inflorescences terminal, lateral or axillary:
14a Spines present; corolla showy; fruit large:
15a Corolla tube much shorter than the lobes; calyx lobes oblong, ovate or spathulate, persistent and ± accrescent in fruit; leaves very often pubescent ..... **Catunaregam**
15b Corolla tube distinctly longer than the lobes; calyx limb with short triangular teeth, persistent in fruit; leaves always glabrous ..... **Hyperacanthus**
14b Spines absent; corolla and fruit as above or not:
16a Deciduous straggling shrubs; flowers precocious; flowers and fruit sessile, clustered on mature branches with leaves restricted to apical and lateral shoots; bracts/bracteoles chaffy; corolla white, tinged pink; fruit red, 12–20 mm in diameter with large circular calyx scar ..... **Feretia**
16b Combination of characters not as above:
17a Inflorescences axillary with flower(s) in both axils of a node or supra-axillary, pedunculate or sessile, if on brachyblasts (contracted lateral spurs) see contrast 17b; corolla lobes always contorted:
18a Inflorescences pedunculate, distinctly and rather laxly branched; flowers always pedicellate:
19a Stipules often blackening when dry; corolla tube cylindrical, ± equal to lobes in length; seeds with a small ± circular excavation, or a partly ruminate endosperm ..... **Tarenna**
19b Stipules not tending to blacken when dry; corolla tube and seeds not as above; corolla funnel-shaped to campanulate; endosperm entire ..... **Kraussia**
18b Inflorescences 1–few-flowered, or congested glomerules, sometimes shortly pedunculate; flowers often pedicellate:
20a Calyx limb reduced to a rim, usually shorter than the disc, but occasionally truncate and ± equalling the disc; corolla tube ± equal to lobes; anthers and style exserted; fruit 2-seeded; seeds with a well-defined groove on the ventral face (typical coffee-beans); inflorescence 1–several-flowered ..... **Coffea**
20b Calyx limb mostly at least equalling the disc, truncate, dentate or lobed; fruit 2–many-seeded; seeds lacking a ventral groove:
21a Anthers ± medifixed, the connective not enlarged; thecae ± contiguous and subparallel; bacterial nodules absent ..... **Tricalysia**
21b Anthers basifixed, the connective enlarged so that the thecae diverge; linear bacterial nodules often present along the midrib and petiole ..... **Sericanthe**
17b Inflorescences terminal on main and lateral branches (occasionally appearing axillary by extreme reduction of lateral branches in which case bacterial nodules are present in the leaves), or lateral (i.e. alternate, with inflorescence in only one axil at each node); sometimes with a few axillary inflorescences in addition to the terminal one, or borne on brachyblasts (contracted lateral spurs); corolla lobes contorted, valvate or sometimes imbricate:
22a Corolla tubular below, funnel-shaped to narrowly campanulate above with short erect lobes; anthers included; style long-exserted; capsules oblong or subcylindric, lenticellate; seeds with wing bifid at one end ..... **Hymenodictyon**
22b Corolla not as above; fruit, if capsular, then ± globose and not lenticellate; seeds unwinged, or with a fimbriate wing:
23a Corolla white with dense yellow hairs around narrow throat forming a star-shaped eye, corolla lobes imbricate; style slender with 2 linear arms; stipules almost completely divided into 2 separate lobes ..... **Heinsia**
23b Corolla lacking an eye, corolla lobes contorted; flowers mostly with secondary pollen presentation:
24a Inflorescences strictly lateral; stipules green, moderately conspicuous, triangular or ovate, scarcely sheathing; seeds not held together by pulpy tissue, seed surface with a fingerprint-like pattern of striations:

25a Shrub or small tree, seldom less than 1 m tall; corolla tube narrowly cylindrical ..... **Oxyanthus**
25b Small shrub, or less often a tree, 0.3–1.8(–5) m tall; corolla tube cylindrical at base and funnel-shaped above ..... **Mitriostigma**
24b Inflorescences and stipules not as above; seeds 1 or few to numerous, often held together by pulpy tissue; seed surface lacking a fingerprint-like pattern:
26a Plants with brachyblasts (contracted lateral spurs) or cushion shoots:
27a Corolla tube usually at least 15 mm long; calyx lobes narrowly triangular to lanceolate ..... **Gardenia**
27b Corolla tube up to 7 mm long; calyx lobes ovate, often spathulate, separated by broad sinuses:
28a Corolla rotate, tube scarcely exceeding the calyx; calyx lobes 4–7(–13) mm long; fruit yellow-green or brown when ripe, 18–33 × 17–25 mm ..... **Catunaregam**
28b Corolla funnel-shaped, tube longer than the lobes; calyx lobes 0.5–1.5(–2.5) mm long; fruit black, 5–7 mm in diameter ..... **Coddia**
26b Plants without brachyblasts or cushion shoots, lateral branches often short but with leaves clearly spaced:
29a Inflorescence usually borne on a very short shoot above a single leaf; corolla tube variously shaped; flowers markedly showy; fruit ± ovoid, 18–85 mm long; ovules numerous; seeds numerous in pulpy tissue; testa present ..... **Rothmannia**
29b Inflorescence essentially terminal, sometimes overtopped by the growing apex, or pseudoaxillary (due to suppression of lateral branches); corolla tube mostly cylindrical to narrowly funnel-shaped:
30a Flowers 1 or up to 3 on a common peduncle, markedly showy, sometimes overtopped by the stem apex; fruit large; seeds numerous in pulpy tissue:
31a Branches and leaves often ternate; stipules sheathing, often truncate but sometimes triangular, with sticky exudate when young; flowers solitary; calyx limb-tube truncate or often with decurrent lobes; corolla lobes contorted to the left; fruit thick-walled ..... **Gardenia**
31b Branches and leaves not ternate; stipules ovate, tightly inrolled at apex and readily falling, lacking a sticky exudate; flowers 1–3; calyx lobes not decurrent; corolla lobes contorted to the right; fruit fairly thin-walled ..... **Hyperacanthus**
30b Flowers if showy then more than 3, never overtopped by stem apex; fruit mostly small to moderately large; seeds 1–few, or if numerous then seeds free:
32a Fruit a capsule, ± globose; seeds with a fimbriate wing; corolla distinctly pubescent outside; lobes 4–6; anthers ± two-thirds exserted ..... **Crossopteryx**
32b Fruit not dehiscent; seeds never winged; corolla pubescent or more often glabrous outside; lobes 4 or 5(6); anthers usually fully exserted:
33a Calyx lobes subfoliaceous, 8–30 mm long, persistent in fruit; corolla large, tube 20–110 mm long, pubescent outside; fruit large, 8–22 mm in diameter; seeds numerous; stipules conspicuous, either triangular and erect or ± rounded and reflexed ..... **Leptactina**
33b Calyx lobes not nearly as conspicuous as above; corolla generally smaller; seeds 1–several; stipules less conspicuous, never rounded and reflexed:
34a Flowers 5(6)-merous; fruit 1–several-seeded; seeds variously shaped, entire or ruminate; stipules often with central area darkened (dark green when fresh, or black when dry) but difficult to observe in taxa with reduced branches ..... **Tarenna**
34b Flowers 4-merous; fruit 2-seeded; seeds ± hemispherical with an excavation on the ventral face; stipules never with central area darkened; bacterial nodules usually present in the leaf blades, either scattered or arranged along the midrib ..... **Pavetta**

Key 5 — **Vanguerieae (from couplet 11 in Key 1 and couplet 13 in Key 4)**

1a Spines present:
2a Ovary 2(–4)-locular; pollen presenter 2(–4)-lobed at apex; calyx truncate or 4- or 5-toothed; corolla broadly cylindrical to campanulate, with or without hairs within ..... **Canthium**
2b Ovary 3-locular; pollen presenter 3-lobed at apex; calyx 4-toothed; corolla campanulate, with deflexed hairs within..... **Plectroniella**
1b Spines 0:
3a Inflorescence umbellate (sometimes 1-flowered), entirely enclosed in bud by paired connate persistent bracts; style attached to base of pollen presenter; flowers bi- or unisexual; leaves usually with tertiary venation obscure; corolla throat densely congested with hairs ..... **Pyrostria**
3b Inflorescence never enclosed by paired bracts; style attached in recess above the base of the pollen presenter, rarely as above; other characters not so combined:
4a Corolla lobes linear-lanceolate, 20–40 mm long, greatly exceeding tube, erect, tomentose or pubescent outside; fruit 20–40 mm long with calyx remains triangular to linear, pyrenes 2 ..... **Vangueriopsis**
4b Corolla lobes not as above; fruit smaller, or if large, then with more than 2 pyrenes or with calyx remains cupular:
5a Climbers and/or scandent shrubs ..... **Keetia**
5b Trees, shrubs (sometimes subscandent), herbs or subshrubby herbs:
6a Subshrubby herbs or single-stemmed shrubs from a woody rootstock:

7a Ovary (or fruit) 2-locular; pollen presenter 2-lobed at tip:
8a Leaves densely villous-tomentose ..... **Eriosemopsis**
8b Leaves glabrous or with sparse bristly hairs on both surfaces ..... **Pygmaeothamnus**
7b Ovary (or fruit) (2)3–8-locular; pollen presenter 3–8-lobed at the tip:
9a Small subshrubs up to 0.25 m tall; fruit 15–17 mm across; leaves usually paired, glabrous or with seta-like hairs on both sides; calyx lobes linear or linear-lanceolate ..... **Pachystigma**
9b Larger subshrubs, often with virgate stems; fruit not usually more than 10 mm across; other characters not combined as above:
10a Leaves glabrous to pubescent, only occasionally velvety; corolla glabrous or pubescent; calyx lobes 0 to quite well developed, up to 3.5 mm long; leaves almost invariably in whorls of 3–6 ..... **Fadogia**
10b Leaves velvety, entirely covered with silky hairs; corolla velvety; calyx lobes triangular or linear; leaves paired or sometimes in 3s ..... **Ancylanthos**
6b Shrubs or trees (1–)2–20 m high:
11a Ovary or fruit 2(3)-locular; pollen presenter 2(3)-lobed at the tip:
12a Style ± as long as the corolla tube, sometimes slightly exceeding it, rarely up to twice as long; pollen presenter ± as wide as long or wider:
13a Pollen presenter coroniform, usually wider than long, (2)3–5-lobed; corolla lobes often with an apical appendage ..... **Rytigynia**
13b Pollen presenter ± spherical, ± as wide as long, 2(3)-lobed; corolla lobes without an apical appendage… ..... **Canthium**
12b Style ± twice as long as corolla tube or often longer; pollen presenter distinctly longer than wide:
14a Trees, shrubs or lianas; leaves typically subcoriaceous to coriaceous and drying light green or occasionally chartaceous; pyrene cartilaginous to woody with shallow apical crest; endosperm entire ..... **Psydrax**
14b Lianas or scandent bushes with perpendicular lateral branches, often subtended by rotund leaves; leaves chartaceous to subcoriaceous (rarely coriaceous); pyrene woody with lid-like area surrounding crest; endosperm frequently streaked with resinous areas ..... **Keetia**
11b Ovary or fruit (2)3–5-locular; pollen presenter 3–5-lobed at the tip:
15a Calyx lobes 8–16 mm long, ± leafy ..... **Lagynias**
15b Calyx lobes usually shorter, mostly linear or triangular, at most subfoliaceous:
16a Pollen presenter coroniform, mostly broader than long ..... **Rytigynia**
16b Pollen presenter long-fusiform to cylindric, longer than broad:
17a Inflorescence a dichasial cyme with flowers scattered along the arms, usually lax and many-flowered; fruit large and globose, 14–50 mm in diameter (when dry); pollen presenter cylindrical, furrowed ..... **Vangueria**
17b Inflorescence varying from solitary flowers to fascicles or dichasial cymes, but mostly condensed; fruit often small, not over 30 mm in diameter when dry; pollen presenter broadly cylindrical…… ..... **Pachystigma**

Agathisanthemum Klotzsch 8136140

(Rubioideae—Hedyotideae)

Klotzsch: 294 (1862); Bremekamp: 152 (1952); Verdcourt 254 (1976); Verdcourt: 107 (1989).

Perennial herbs or subshrubs; stems simple or sparsely branched. **Leaves** sessile or subsessile, ovate-oblong to narrowly lanceolate, mucronate, with margin revolute; stipule sheath produced into a 3–15-fimbriate lobe. **Flowers** heterostylous; in terminal, many-flowered cymes or corymbs or capitate clusters; bracteate. **Calyx** 4-lobed to halfway or more, lobes lanceolate to ovate-triangular, keeled. **Corolla** 4-lobed, white; lobes minutely papillose on inner face; tube densely bearded within. **Stamens** arising at sinuses of corolla; filaments glabrous; anthers dorsifixed. **Disc** farinose or very shortly pubescent. **Ovary** 2-locular, with many ovules in each locule on shortly stalked, peltate placentas; style usually undivided; stigma lobes subglobose or ovoid. **Fruit** a shortly pointed capsule, with loculicidal and septicidal dehiscence. **Seeds** many, angular. $x = 9$ (polyploidy).

Species ± 6, tropical Africa, Comoro Islands; 3 in sthn Afr., Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal.

Alberta E.Mey. 8343000

(Antirheoideae—Alberteae)

Meyer: 258 (1838); Sonder: 15 (1865); Hooker: 22 & 109 (1873); Schumann: 89 (1891); Cavacoa: 517 (1965); Puff *et al.*: 338 (1984).

Large shrubs or trees. **Leaves** decussate, subsessile or petiolate, oblong, obtuse; stipules cup-shaped, broad, aristate, deciduous. **Flowers** ± irregular, terminal on lateral branches; inflorescences thyrsic; bracts small to minute. **Calyx** unequally 5-lobed, hairy without and within, lobes longer than tube, with 3 small lobes ovate-acute, 2 others oblong-obtuse, enlarged and pink or red in fruit; tube shallow. **Corolla** 5-lobed, pubescent; lobes ovate, subacute; tube long, funnel-shaped, somewhat curved. **Stamens** 5, arising in upper part of corolla tube; anthers included, sessile, linear, with apical tail and obtuse, sagittate base, hairy on back. **Disc** annular. **Ovary** 2-locular, with a solitary pendulous ovule in each locule; style ± curved, long-exserted, glabrous; stigma lobes 2, minute, filiform to elliptic. **Fruit** indehiscent, small, oval, crowned with large, spathulate, veined, coloured calyx lobes. $x = 9$, 11 (1 report, aneuploids, polyploidy).

Species ± 5, 4 in Madagascar; 1 in sthn Afr.: *Alberta magna* E.Mey., N KwaZulu-Natal to border of Eastern Cape.

Amphiasma Bremek. 8136170

(Rubioideae—Hedyotideae)

Bremekamp: 168 (1952); Launert: 5 (1966); Verdcourt: 111 (1989).

Perennial herbs or subshrubs; stems subterete, glabrous or glabrescent. **Leaves** sessile, slender to filiform, rigidly mucronate, margins revolute; stipule sheath mostly tubular, truncate or sometimes with 2 small cusps. **Flowers** isostylous or heterostylous; in terminal, sometimes also axillary cymes, rarely aggregated into corymbs, bracteate; bracts connate. **Calyx** 4-partite almost to base; lobes triangular. **Corolla** white, somewhat funnel-shaped; lobes shorter than tube, spreading, bearded

on inner face to ± middle. **Stamens** included in long-styled flowers, exserted in isostylous and short-styled flowers; filaments glabrous; anthers dorsifixed. **Disc** cushion-shaped, farinose. **Ovary** 2-locular, with fairly many ovules in each locule, attached to shortly stalked, shield-like placentas arising below middle of septum; style glabrous, included in short-styled flowers, exserted in long-styled and isostylous flowers; stigma lobes filiform, papillose. **Fruit** a globose loculicidal capsule, slightly beaked. **Seeds** dorsiventrally compressed, oblong, smooth, brown.

Species ± 6, tropical and southwestern part of Africa; 3 in sthn Afr., Namibia.

Ancylanthos Desf. 83600000

(Antirheoideae—Vanguerieae)

Desfontaines: 5 (1818) as *Ancylanthus*; Robyns: 324 (1928); Phillips: 734 (1951); Launert: 7 (1966); Verdcourt & Bridson: 800 (1991); Bridson: 236 (1998).

Shrubs or shrublets, rigid, tomentose. **Leaves** opposite, rarely 3-nate, shortly petiolate, lanceolate or elliptic, somewhat paler on undersurface; stipules connate into a sheath, densely hairy within, distinctly subulate-caudate at apex. **Flowers** solitary or in few- to several-flowered, simple or branched, peduncled, pubescent to tomentose cymes; bracts small. **Calyx** 5-lobed, hairy; lobes much longer then saucer-shaped tube. **Corolla** 5-lobed, yellow or orange-yellow, hairy; lobes ovate or ovate-lanceolate, reflexed, shorter than tube; tube elongate, slightly curved, with a ring of reflexed hairs near base within throat. **Stamens** 5, arising in corolla throat, mainly included; filaments broadly linear, much shorter than anthers; anthers lanceolate-linear. **Disc** annular. **Ovary** 5-locular, with a single pendulous ovule in each locule; style slender, glabrous, shortly exserted, pollen presenter large, cylindrical, shortly 5-lobed at apex. **Fruit** a fleshy, globose drupe crowned with calyx limb, with 5 pyrenes.

Species 5, tropical Africa; 1 in sthn Afr.: *Ancylanthos rubiginosus* Desf., Namibia and Botswana.

Anthospermum L. 8438000

(Rubioideae—Anthospermeae)

Linnaeus: 1058 (1753); Linnaeus: 479 (1754); Sonder: 26 (1865); Hooker: 140 (1873); Schumann: 129 (1891); Phillips: 735 (1951); Verdcourt: 324 (1976); Puff: 8 (1986a); Puff: 150 (1989).

Large or dwarf shrubs, short-lived subshrubs or perennial herbs, male, female, bisexual, bisexual + female, or occasionally male + bisexual + female, bisexual + male, or male + female. **Leaves** decussate or occasionally in whorls of 3(4), often seemingly in much larger numbers at nodes, blades ± broad and large to ± ericoid and small, mostly narrowed to base, acute to acuminate (seldom ± mucronate or ± obtuse) at apex, shortly petiolate to sessile; stipular sheaths ± cup-shaped, bearing 1 to many setae or fimbriae on either side. **Inflorescence** frequently leafy and inconspicuous, made up of mostly subsessile, many- to very few-flowered cymes; in dioecious taxa often sexually dimorphic (female inflorescence contracted, ± cylinder-like). **Flowers** mostly subsessile, subtended by a pair of leafy bracts, male, bisexual or female, 4- or 5-merous. **Calyx**: lobes large, conspicuous to small, indistinct or ± lacking. **Bisexual** and **male flowers**: corolla with tube cylindrical, broadly funnel-shaped to subcampanulate, lobes recurved, ± lanceolate; anthers yellowish to whitish, exserted, dangling on long, slender, filiform filaments. **Female flowers**: corolla much smaller than in male flowers; tube cylindrical; lobes mostly erect, linear to ± lanceolate. **Ovary** bicarpellate, 2-locular, in 2 species 1 carpel reduced; ovule 1 per locule; style 0 or very short; stigmas usually 2, long-exserted, hairy, greyish to greenish white, seldom purplish red. **Fruit** crowned by persistent calyx lobes, supported by a ± U-shaped carpophore, dehiscing into two mericarps, each convex on dorsal side, plane to concave or sometimes hollowed out and with a prominent to inconspicuous median, longitudinal ridge on ventral side. $x = 11$ (aneuploids, polyploidy).

Species 40, Africa and Madagascar; 21 in sthn Afr., widespread.

Breonadia Ridsdale 8226000

(Cinchonoideae—Naucleeae)

Ridsdale: 549 (1975); Bridson & Verdcourt: 443 (1988).

Adina Salisb.: 115 (1807) in part.

Trees or shrubs; terminal vegetative buds conical. **Leaves** usually in whorls of 4, petiolate, elongate, lanceolate; stipules narrowly triangular, deciduous. **Flowers** in pedunculate, dense, spherical, heads, with 2 connate bracts on each peduncle; each flower subtended by a linear-spatulate bract. **Calyx** 5-lobed, lobes oblong; limb-tube developed, densely hairy. **Corolla** 5-lobed, hairy; pinkish green or white or yellowish brown, lobes elliptic, concave, imbricate; tube cylindric, 5-ribbed, glandular within. **Stamens** 5, arising in throat of corolla, included; filaments linear, shorter than anthers; anthers basifixed, oblong, sagittate, apiculate. **Ovary** 2-locular, with several pendulous ovules in each locule; placenta attached to upper third of septum; style terete, long-exserted; pollen presenter club-shaped. **Fruit** septicidal capsules, clustered in hard, brown, spherical heads. **Seeds** ovoid or obovoid, compressed, not winged.

Species 1; tropical Africa and Madagascar: *Breonadia salicina* (Vahl) Hepper & J.R.I.Wood, Northern Province, Mpumalanga, KwaZulu-Natal and Swaziland.

Burchellia R.Br. 8281000

(Ixoroideae—Gardenieae—Gardeniinae)

Brown: t. 466 (1820); Sonder: 2 (1865); Phillips: t. 145 (1924); Phillips: 725 (1951).

Shrubs or small trees. **Leaves** shortly petiolate, obovate-oblong, obtuse, leathery; stipules cuspidate, deciduous. **Flowers** in many-flowered clusters or heads. **Calyx** 5-lobed, pubescent within and without; lobes linear, longer than tube; tube campanulate. **Corolla** 5-lobed, lobes ovate, much shorter than tube; orange to dark red, hairy; tube funnel-shaped, with ring of hairs near base. **Stamens** 5, arising in upper part of corolla tube, included; anthers sessile, linear, with ovate, apical appendage. **Disc** tumid. **Ovary** 2-locular, with many ovules in each locule; style terete, ± included; stigma thick, lanceolate-elliptic, ribbed. **Fruit** a globose, 2-locular, many-seeded berry, crowned with persistent calyx. **Seeds** somewhat compressed, transversely oblong, with ± whorled ridges. $x \approx 11$ (aneuploids).

Species 1, endemic in sthn Afr.: *Burchellia bubalina* (L.f.) Sims, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Canthium Lam. 8352000

(Antirheoideae—Vanguerieae)

Lamarck: 602 (1785); Sonder: 16 (1865); Phillips: 732 (1951); Verdcourt & Bridson: 861 (1991); Bridson: 366 (1992); Bridson: 315 (1998).

Shrubs or small trees, sometimes scandent; spines, if present, straight. **Leaves** paired, petiolate; domatia either 0, pit-like or present as tufts of hair; shortly sheathing, apiculate or aristate, glabrous or pubescent within. **Flowers** pedicellate or not; in pedunculate to subsessile, few- to many-flowered cymes; bracteoles inconspicu-

ous. **Calyx** with 4 or 5 teeth, rarely lobed, saucer- or basin-shaped. **Corolla** 4- or 5-lobed, white or yellowish, glabrous; lobes reflexed, obtuse, acute or shortly apiculate; tube broadly cylindrical, with or without a ring of deflexed hairs inside, often pubescent at throat. **Stamens** 4 or 5, arising in corolla mouth; filaments usually shorter than anthers. **Disc** annular, glabrous or pubescent. **Ovary** 2(–4)-locular, with a single pendulous ovule in each locule; style slender, shortly exceeding corolla tube, glabrous; stigmatic knob ± spherical, point of attachment distinctly recessed, 2(3)-lobed. **Fruit** a (1)2(3)-seeded drupe with pyrenes ellipsoid to ovoid or obovoid, often flattened on ventral face, with a shallow crest extending to apex, usually rugulose. $x = 11$ (aneuploids, polyploidy).

Species 52, tropical areas of the Old World; 13 in sthn Afr, widespread in the eastern regions but absent from Namibia, Northern Cape and Western Cape.

Carpacoce Sond. 8443000

(Rubioideae—Anthospermeae)
Sonder: 32 (1865); Hooker: 141 (1873); Schumann: 130 (1891); Phillips: 736 (1951); Puff: 52 (1986a).

Dwarf shrubs, rarely perennial herbs, bisexual, female, or occasionally male, bisexual + female, or bisexual + male. **Leaves** decussate or (rarely) in whorls of 3, often ericoid, ± pungent, acuminate or acute at apex, (sub)sessile; stipular sheaths cup- or funnel-shaped, bearing minute setae or (less commonly) longer bristles on either side. **Inflorescence** frequently very inconspicuous, made up of flowers paired or solitary at nodes, or of mostly few-flowered cymes. **Flowers** bisexual, female or occasionally male. **Calyx** 3–5(6)-lobed, lobes leaf-like, often unequal in size. **Corolla** 4–7-lobed; lobes linear to ± lanceolate, hooded, spreading to spreading-recurved (bisexual, male) or ± erect (female); tube cylindrical to ± narrowly funnel-shaped; in bisexual and male flowers corolla much larger than in female flowers. **Stamens** 4–7; anthers purplish red to dark purplish brown, exserted, dangling on long, slender, filiform filaments. **Ovary** 2-carpellate with 1(2) fertile, erect ovule(s); style 0; stigmas 1(2), long-exserted, hairy, purplish red, greenish grey, greyish or whitish. **Fruit** 1(2)-seeded, crowned by persistent calyx lobes; exocarp dehiscing into valves, releasing endocarp with enclosed seed. $x = 11$ (aneuploids).

Species 7, endemic in the Western Cape, only one extends to the Bathurst and Albany Districts in the Eastern Cape.

Carphalea Juss. 8157000

(Rubioideae—Hedyotideae)
Jussieu: 198 (1789); Verdcourt: 82 (1989).

Dirichletia Klotzsch: 494 (1853).

Shrubs, glabrous or pubescent; stems subterete, erect, branched. **Leaves** paired or in whorls of 3, shortly petiolate, tricuspidate or 3–5-setose; stipules with 3–5 linear or filiform colleter-tipped setae from a short base adnate to petioles. **Flowers** dimorphic; in terminal corymbose heads. **Calyx** entire or 4- or 5-lobed, becoming white; tube small, campanulate; limb strongly accrescent, oblique, dilated, reticulated, shallow. **Corolla** 5-lobed, valvate, white; tube elongated, densely hairy in throat. **Stamens** 5, arising from throat or corolla, included or exserted; anthers linear-oblong. **Disc** fleshy. **Ovary** 2(3)-locular, each locule with a slender basal placenta bearing ± 4–6 ovules; style filiform; stigma with 2(4) filiform lobes. **Fruit** apparently always indehiscent, obconic, strongly ribbed, ribs running out into accrescent calyx lobes, 1- or 2-seeded. **Seeds** narrowly oblong-obconic. $x = 11$.

Species 14, tropical Africa and Madagascar; 1 in sthn Afr.: *Carphalea pubescens* (Klotzsch) Verdc., Namibia and Botswana.

Catunaregam Wolf 8283100

(Ixoroideae—Gardenieae—Gardeniinae)
Wolf: 75 (1776); Bridson & Verdcourt: 496 (1988).

Xeromphis Raf.: 21 (1838).

Shrubs or small trees, usually with spines formed from modified lateral branchlets. **Leaves** usually clustered on short, opposite, axillary branchlets or cushion-like shoots; stipules short, ovate-acuminate or triangular, apiculate, deciduous. **Flowers** 1 or 2(3) together, terminating opposite pairs of abbreviated lateral shoots. **Calyx** 5-lobed, lobes short; tube ovoid or campanulate; limb-tube shortly cylindrical, ellipsoid or urceolate. **Corolla** white, densely pubescent outside except for base of tube; tube ± campanulate, shorter than lobes, with a circular band of long hairs within. **Stamens** 5, arising on corolla tube or in mouth, exserted or included; filaments linear, shorter than anthers; anthers oblong or linear. **Ovary** 2-locular, placentae attached to septum; ovules many; style terete or thickened upwards, as long as tube or exserted; stigma ellipsoid or cylindrical, grooved or 2-lobed. **Fruit** 2-locular, globose, many-seeded, crowned by persistent calyx lobes. **Seeds** discoid or compressed-ellipsoid with slightly raised reticulation on testa.

Species ± 6, tropical Africa to Asia; a subspecies, *Catunaregam spinosa* (Thunb.) Tirveng. subsp. *spinosa*, in Botswana, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Cephalanthus L. 8230000

(Antirheoideae—Cephalantheae)
Linnaeus: 95 (1753); Phillips: 724 (1951).

Shrubs, small trees or sometimes scandent. **Leaves** elliptic or ovate-elliptic, entire; stipules ovate, acuminate. **Flowers** in dense globose heads; heads terminal on short branches, peduncled. **Calyx** 5-lobed, very much shorter than corolla; lobes ovate to oblong. **Corolla** 5-lobed; lobes imbricate, ovate, ciliate on inner face, somewhat fleshy, glabrous, maroon; tube funnel-shaped, long, gradually widening from base upwards, greenish white to yellowish. **Stamens** 5, arising deep in corolla throat, included; filaments linear, shorter than anthers; anthers linear, bluntly apiculate, shortly sagittate. **Ovary** 2-locular, with a solitary, pendulous ovule in each locule; style terete, long-exserted, gradually thickening upwards into a club-shaped stigma. **Fruit** clustered in dense globose heads, subsucculent, breaking into 1-seeded cocci. **Seeds** ± ovate in outline, convex on one side, flat on other. $x = 11$ (1 report, aneuploids, polyploidy).

Species 6, tropical regions and North America; 1 in sthn Afr.: *Cephalanthus natalensis* Oliv., Northern Province, KwaZulu-Natal and Swaziland.

Coddia Verdc. 8283110

(Ixoroideae—Gardenieae—Gardeniinae)
Verdcourt: 509 (1981).

Randia L. in part. *Xeromorphis* in part, sensu Codd: 110 (1961).

Shrubs or small trees. **Leaves** opposite or, more usually, densely clustered on dwarf side branchlets; stipules ovate-triangular. **Flowers** solitary, axillary, 1–3 together at ends of abbreviated shoots. **Calyx** 5-lobed; lobes elliptic, linear-oblong, usually ovate; tube ellipsoid; limb campanulate. **Corolla** 5-lobed, white; lobes oblong-

elliptic; tube with base cylindric, upper part funnel-shaped, with a circular band of long hairs within. **Stamens** 5, arising in corolla mouth, partly included; anthers linear, sessile, apiculate. **Ovary** 2-locular; ovules ± 5–8 on thin, broadly attached placenta on fleshy locule septum; style narrowly clavate, winged at apex. **Fruit** 2-locular, indehiscent, crowned with persistent calyx lobes. **Seeds** compressed, ovoid-angular. $x = 11$ (1 report, aneuploids).

Species 1, endemic in sthn Afr.: *Coddia rudis* (E.Mey. ex Harv.) Verdc., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Coffea L. 8381000

(Ixoroideae—Gardenieae—Gardeniinae)
Linnaeus: 172 (1753); Hiern: 179 (1877); Bridson & Verdcourt: 703 (1988).

Shrubs or small trees. **Leaves** petiolate, glabrous; domatia usually present; stipules very shortly connate above axils, ovate or lanceolate, apiculate. **Flowers** axillary or terminal, solitary or clustered, bracteate; bracts usually connate into a single or double cup. **Calyx** persistent with tube shortly campanulate, turbinate or urceolate; shortly toothed or cleft. **Corolla** (4)5–7(8)-lobed, white; lobes contorted, spreading; tube cylindric or somewhat funnel-shaped, glabrous in throat. **Stamens** usually 5–7, arising in mouth of corolla tube, partly included or exserted; filaments short or obsolete; anthers slightly dorsifixed. **Disc** fleshy. **Ovary** 2-locular, with a solitary ovule in each locule on subpeltate placenta attached to middle of septum; style filiform, usually shortly exserted; stigma with 2, usually divergent arms. **Fruit** a ± ellipsoidal drupe, usually fleshy, with 1 or 2 1-seeded pyrenes. **Seeds** oblong-ellipsoid, deeply grooved on inner face ('coffee beans'), shiny. $x = 11$ (10) (polyploidy).

Species 40, in Old World tropics, especially Africa; 2 in sthn Afr.: *Coffea racemosa* Lour., KwaZulu-Natal and *C. zanguebariae* Lour., Mpumalanga.

Conostomium (Stapf) Cufod. 8136070

(Rubioideae—Hedyotideae)
Cufodontis: 85 (1948); Bremekamp: 125 (1952); Verdcourt: 242 (1976); Verdcourt: 101 (1989).

Oldenlandia L. sect. *Conostomium* Stapf: 517 (1906).

Erect, perennial herbs or subshrubs, usually with quadrangular branches. **Leaves** opposite, sessile, linear to lanceolate; stipule sheath truncate, bearing hairs and colleters or 2–several teeth. **Flowers** never truly heterostylous; in terminal, fasciculate corymbs. **Calyx** 4-partite; segments linear-subulate. **Corolla** 4-lobed, white, mauve or purple; throat and lobes glabrous within or sparsely pilose; tube long, narrowly cylindric below and slightly expanded above. **Stamens** with anthers sessile or subsessile, included or only tips exserted. **Ovary** 2-locular, with many ovules in each locule, attached to shortly stalked, shield-like placentas; style glabrous or papillose, usually exserted; stigmas linear-oblong, densely papillate. **Fruit** an ovoid or subglobose capsule, crowned by persistent calyx, beak present. **Seeds** many, angular, smooth. $x = 9$ (1 report, aneuploids).

Species 9, tropical East Africa; 2 in sthn Afr.: *Conostomium natalense* (Hochst.) Bremek., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Eastern Cape; and *C. zoutpansbergense* (Bremek.) Bremek., Northern Province.

Crossopteryx Fenzl 8212000

(Cinchonoideae—Cinchoneae)
Fenzl: 45 (1839); Hiern: 43 (1877); Launert: 10 (1966); Bridson & Verdcourt: 455 (1988).

Small trees or shrubs. **Leaves** shortly petiolate, elliptic or ovate-elliptic; stipules ovate, acuminate. **Flowers** in dense, branched, terminal corymbose panicles. **Calyx** toothed; teeth erect, obtuse, deciduous; tube obovoid or globose. **Corolla** lobed, creamy white or pale yellow, somewhat fleshy, glabrous; lobes ovate, ciliate on inner face, contorted; tube long, funnel-shaped, gradually widening from base upwards. **Stamens** 4–6, arising deep in corolla throat, included; filaments linear, shorter than anthers; anthers linear, bluntly apiculate, shortly sagittate. **Ovary** 2-locular, with few ovules in each locule; placentas affixed peltately to septum; style terete, exserted; stigma 2-lobed, club-shaped. **Fruit**: capsules in dense heads, subsucculent; ellipsoid or globose, few-seeded. **Seeds** peltate, dorsally very compressed; testa membranous, expanded into a broad, lobulate and elegantly fimbriate wing. $x = 11$ (1 report).

Species 1, tropical Africa: *Crossopterix febrifuga* (Afzel. ex G. Don) Benth., Namibia, Botswana and Northern Province.

***Diodia** L. 8471000

(Rubioideae—Spermacoceae)
Linnaeus: 104 (1753); Linnaeus: 45 (1754); Sonder: 23 (1865); Hiern: 230 (1877); Verdcourt: 162 (1989).

Annual or perennial herbs, often diffusely branched with slender, angled branches. **Leaves** sessile or subsessile; blades linear to ovate; stipules with 3–6 setose lobes and sheathing at base. **Flowers** axillary, small, solitary or verticillate. **Calyx** 2–4-lobed with lobes persistent, or disepalous; tube ovoid to obovoid. **Corolla** usually 4-lobed, white; lobes short, valvate; tube funnel-shaped, membranous. **Stamens** usually 4, arising in throat of corolla tube, exserted; anthers dorsifixed. **Ovary** usually 2-locular, with 1 ovule in each locule attached at ± middle of septum; style slender, exserted, bidentate at apex; stigma subcapitate. **Fruit** separating into indehiscent mericarps, with pericarp not adnate to seed. $x = 7$ (polyploidy).

Species ± 30, tropical and warm regions of America and Africa; 1 in sthn Afr.: **Diodia dasycephala* Cham. & Schltdl. is a roadside weed in Eastern Cape.

Eriosemopsis Robyns 8351010

(Antirheoideae—Vanguerieae)
Robyns: 38 (1928); Phillips: 729 (1951).

Perennial herbs, villous-tomentose; with woody rootstock. **Leaves** sessile or subsessile, elliptic; stipules small, subulate, connate at base. **Flowers** few in pedunculate, axillary cymes. **Calyx** 5(6)-partite, villous; segments linear, somewhat unequal. **Corolla** 5(6)-lobed, green, villous; lobes reflexed, ovate-acuminate, longer than tube; tube campanulate, villous in throat. **Stamens** 5(6), arising in corolla mouth, exserted; filaments linear, ± as long as anthers; anthers oblong. **Disc** tumid. **Ovary** 2-locular, with a single pendulous ovule in each locule, attached to upper part of septum; style terete, subexserted; stigma globose, 2-lobed. **Fruit** globose, tipped with persistent calyx.

Species 1, endemic in sthn Afr.: *Eriosemopsis subanisophylla* Robyns, S KwaZulu-Natal and border of Eastern Cape.

Fadogia Schweinf. 8359010

(Antirheoideae—Vanguerieae)
Schweinfurth: 47 (1868); Robyns: 41 (1928); Phillips: 733 (1951); Verdcourt & Bridson: 786 (1991); Bridson: 265 (1998).

Perennial herbs, usually with several stems from a woody rootstock, shrublets or shrubs. **Leaves** 3–5-nate, rarely opposite, shortly petiolate, sometimes pale on

undersurface; stipules small, connate at base, often villous within, persistent, 3–5-tailed. **Flowers** usually few in pedunculate cymes, rarely solitary; buds obtuse or shortly apiculate. **Calyx** 5–9-lobed, or -toothed; tube shallowly cup-shaped; limb truncate. **Corolla** 5(6)-lobed, white or greenish white; lobes ovate, usually acuminate, as long as or longer than tube, often with mucro behind apex, papillate on inner surface; tube cylindric or campanulate, glabrous or hairy outside, with ring of deflexed hairs inside, pubescent to densely hairy above it, densely hairy or less often glabrous at throat. **Stamens** 5(6), arising in corolla mouth, shortly exserted; filaments linear, shorter than anthers; anthers oblong, sometimes with fleshy apiculus, sometimes sagittate. **Disc** annular. **Ovary** 3- or 4(–9)-locular, with a solitary pendulous ovule in each locule; style terete, shortly exserted; stigma subglobose or shortly cylindric, often truncate at base, shallowly 3–5-lobed, furrowed, sometimes ribbed. **Fruit** usually a globose drupe, sometimes oblique, usually crowned with remains of calyx limb, with 1–3(–9) pyrenes.

Species ± 45, tropical Africa; 3 in sthn Afr., Namibia, Northern Province, Gauteng, Mpumalanga and Swaziland.

Feretia Delile 8299000

(Ixoroideae—Octotropideae)
Delile: 92 (1834); Hooker: 95 (1873); Hiern: 115 (1877); Bridson & Verdcourt: 696 (1988).

Deciduous shrubs; older stems sometimes with greyish bark. **Leaves** shortly petiolate, usually obovate; stipules ovate. **Flowers** 5(4 or 8)-merous, bisexual, precocious, usually 1(or 2) pairs borne on very reduced leafless spurs, sessile. **Calyx** somewhat unequally 4- or 5-lobed; tube narrowly campanulate; lobes lanceolate or oblong, apiculate, glabrous. **Corolla** white, tinged with pink; deeply 4- or 5-lobed; tube narrowly funnel-shaped above, cylindric below, pubescent outside, hairy at throat; lobes oblong or oval, contorted in bud. **Stamens** 4 or 5, arising at mouth of corolla tube; anthers linear, sessile, dorsifixed. **Disc** usually inconspicuous. **Ovary** 2-locular, with 2–5 pendulous ovules in each locule; style slender, exserted, shortly pubescent, stigmatic club entirely bifid but usually cohering except at apex. **Fruit** baccate, globose; calyx lobes eventually deciduous. **Seeds** pendulous, somewhat compressed, with a thin testa. $x = 11$ (1 report).

Species 2, tropical Africa; 1 in sthn Afr.: *Feretia aeruginescens* Stapf, Namibia.

Gaillonia A.Rich. ex DC. 8469000

(Rubioideae—Paederieae)
Candolle: 574 (1830); Thulin: 36 (1998).

Crocyllis E.Mey. ex Hook.f.: 136 (1873); Puff: 3 (1986a).

Gynodioecious, fetid shrubs or dwarf shrubs. **Leaves** decussate, subsessile, linear to ± elliptic, small; stipular sheath narrow, with a small triangular appendage on either side. **Flowers** 5-merous, bisexual (and protandrous) or female, shortly pedicellate, in clusters of several to many, terminal on new growth. **Calyx**: lobes narrowly ovate, much shorter than corolla tube. **Corolla** white. **Stamens** arising in throat of corolla tube. **Ovary** bicarpellate, 2-locular, each locule with a solitary erect ovule; style joined; stigma lobes 2, as long as style. **Fruit** (tardily) dehiscing into 2 mericarps. **Seeds** remaining enclosed in mericarp.

Species 17, Africa and Asia; 1 endemic in sthn Afr.: *Gaillonia crocyllis* (Sond.) Thulin, most southern part of Namibia and adjacent parts of Northern Cape.

Galium L. 8486000

(Rubioideae—Rubieae)
Linnaeus: 105 (1753); Sonder: 35 (1865); Puff: 65 (1986a); Puff: 195 (1989).

Perennial herbs or annuals; stems erect, creeping or climbing, often distinctly 4-angled, glabrous, hairy or with recurved prickles. **Leaves** and stipules similar, in whorls of 4–10, (sub)sessile, blades linear, lanceolate to (ob)ovate, mostly with a prominent midvein (1-nerved). **Flowers** 4-merous, bisexual (and protandrous), rarely male and female, in axillary and/or terminal many- to few-flowered cymes. **Calyx** with lobes obsolete. **Corolla** mostly rotate, greenish (yellow), creamy white to bright yellow; lobes ovate to triangular, acute to acuminate. **Stamens**: anthers exserted. **Ovary** 2-locular, 1 ovule in each chamber, crowned by an often 2-lobed disc; style branches 2, joined below; stigmas capitate. **Fruit** dry, glabrous or variously hairy, dehiscing into (1)2 (sub)globose or reniform 1-seeded mericarps. **Seeds** round on dorsal side, ± excavated on ventral side; 1 mericarp occasionally aborted. $x = 11$ (8, 10, 12) (aneuploids, high polyploidy).

Species ± 400, cosmopolitan; 12 in sthn Afr., widespread but in Namibia known only from the south, and absent from Botswana.

Galopina Thunb. 8435000

(Rubioideae—Anthospermeae)
Thunberg: 3 (1781); Cruse: 18 (1825); Sonder: 26 (1865); Hooker: 139 (1873); Schumann: 128 (1891); Puff: 48 (1986a); Verdcourt: 160 (1989).

Oxyspermum Eckl. & Zeyh.: 365 (1836).

Perennial herbs with branched, often ± woody rhizomes or rootstocks, bisexual, bisexual + female, female or occasionally male, bisexual + male, male + bisexual + female or male + female. **Leaves** decussate, broadly ovate to lanceolate, distinctly petiolate; stipular sheaths with 3–5(–7) setae on either side. **Inflorescence** terminal, paniculate to thyrso-paniculate, bracteate. **Flowers** bisexual, female or male, 4(5)-merous. **Calyx** obsolete. **Bisexual** and **male flowers**: corolla with tube (very) short, broadly funnel-shaped to campanulate, lobes recurved, ± lanceolate; anthers yellowish to whitish, exserted, dangling on long, slender, filiform filaments. **Female flowers**: corolla much smaller, tube cylindrical, sometimes ± 0; lobes erect to spreading, ± linear. **Ovary** 2-locular with a solitary erect ovule per locule; style 0; stigmas 2, long exserted, in bisexual flowers often shorter and thinner than in female flowers, hairy, greyish white, yellowish grey or greenish. **Fruit** dehiscent, not supported by a carpophore; mericarps ± glabrous, tuberculate or covered with long hairs, dorsal side convex, ventral side plane to concave. $x = 11$.

Species 4, S Malawi to southeastern regions of sthn Afr., Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho and Eastern Cape.

Gardenia J.Ellis 8285000

(Ixoroideae—Gardenieae—Gardeniinae)
Ellis: 935 (1761) name conserved; Sonder: 4 (1865); Phillips: 726 (1951); Hallé: 218 (1970); Bridson & Verdcourt: 500 (1988).

Shrubs or small trees, unarmed or lateral branches becoming stoutly spinescent; young parts often glutinous; branches sometimes in whorls of 3. **Leaves** opposite or verticillate, petiolate, thin to distinctly coriaceous; domatia 0 or present; stipules sheathing, ovate. **Flowers** subsessile or shortly pedicellate; solitary or rarely in corymbose heads; buds with wax-secreting glands. **Calyx** 5–8-lobed; tube cylindric to campanulate, sometimes

split partly or completely to base on one side. **Corolla** 5–7-lobed, white, glabrous or hairy; lobes broadly ovate, obovate or elliptic, obtuse or rounded, contorted; tube cylindric, campanulate or funnel-shaped, hairy within. **Stamens** 5–8, arising in throat of corolla tube or lower, included or subexserted; anthers usually with apical appendage. **Disc** tumid, annular or crenate. **Ovary** 2-locular, with many parietal ovules, or 1-locular below and 6-locular above middle; style terete or linear, included or subexserted; stigma linear-lanceolate or clavate, sometimes with tumid ridges in hair-pin shape, sometimes 2-lobed. **Fruit** ovoid or globose, often comparatively large and hard, with a thick fibrous to woody wall, usually many-seeded. **Seeds** compressed, elliptic, smooth or with slightly reticulate testa, stuck together into a solid mass in pulp. $x = 11$.

Species ± 60, in tropical and warm parts of the Old World; 6 in sthn Afr., absent from Northern and Western Cape.

Guettarda L. 8361000

(Antirheoideae—Guettardeae)
Linnaeus: 991 (1753); Hiern: 125 (1877); Verdcourt & Bridson: 923 (1991).

Shrubs or trees. **Leaves** petiolate; stipules interpetiolar or intrapetiolar, simple, free or connate, deciduous. **Flowers** bisexual or polygamodioecious, showing limited heterostyly; usually sessile, mostly secundly arranged in axillary, pedunculate, apically dichotomously branched inflorescences; bracteoles 0 or present. **Calyx**: limb truncate or 2–9-toothed; tube short, campanulate or globose. **Corolla** 4–9-lobed, white, yellowish or red to reddish purple; lobes spreading, imbricate in bud; tube cylindric, elongate, glabrous or thinly bearded within. **Stamens** 4–9, arising on corolla tube, sessile or subsessile; anthers linear, slightly lobed, included or shortly exserted. **Ovary** 2–9-locular; ovules solitary, pendulous; style slender; stigma ± capitate, slightly bifid. **Fruit** a ± globose drupe, 2–9-locular, containing 2–9 pyrenes. $x = 11$ (polyploidy).

Species ± 60, New Caledonia and tropical America; 1 in sthn Afr.: *Guettarda speciosa* L., in coastal sand dune bush of N KwaZulu-Natal.

Heinsia DC. 8326000

(Cinchonoideae—Isertieae)
Candolle: 390 (1830); Hiern: 80 (1877); Phillips: 728 (1951); Bridson & Verdcourt: 476 (1988).

Shrubs or small trees. **Leaves** shortly petiolate; stipules ± completely divided into 2 lobes, subpersistent or eventually falling. **Flowers** solitary or in lax, terminal, rather large, sweetly scented cymes. **Calyx** 4–6-lobed; lobes ± leafy, ovate, to oblong, elliptic or lanceolate; tube turbinate or oblong. **Corolla** 4–6-lobed, white, with dense yellow hairs around narrow throat forming a star-shaped eye, hypocrateriform; lobes variable, usually finely puberulous, spreading; tube slender, adpressed hairy outside, densely hairy at throat. **Stamens** 4–6, situated in tube, included; filaments short; anthers linear. **Disc** small, swollen. **Ovary** 2-locular; ovules many; style slender, with 2 linear, thickened stigma arms just exserted in long-styled flowers, but only reaching to ± halfway up tube in short-styled flowers. **Fruit** slightly fleshy but soon dry, indehiscent, oblong-ellipsoid to subglobose, crowned by persistent calyx lobes, many-seeded. **Seeds** adhering in 2 masses; strongly foveolate, pitted. $x = 11$ (polyploidy).

Species 5, tropical Africa; 1 in sthn Afr.: *Heinsia crinita* (Afzel.) G.Taylor subsp. *parviflora* (K.Schum. & Krause) Verdc., Northern Province.

Hymenodictyon Wall. 8197000

(Cinchonoideae—Cinchoneae)
Wallich: 148 (1824); Bridson & Verdcourt: 452 (1988).

Kurria Hochst.: 233 (1842).

Shrubs or small trees, occasionally lianes. **Leaves** petiolate, deciduous, often with domatia in nerve axils; stipules entire or glandular-serrate, deciduous. **Flowers** in elongate, spicate or capitate inflorescences; spikes composed of 1–3-flowered cymes in axils of minute or moderate-sized bracts. **Calyx** 5-lobed; lobes linear to lanceolate, deciduous; tube subglobose. **Corolla** 5-lobed, white; lobes short, erect, valvate; tube funnel-shaped, glabrous within. **Stamens** 5; anthers subsessile, arising somewhat below glabrous throat of corolla, included. **Disc** annular. **Ovary** 2-locular, with many ovules on ascending cylindrical placentas attached to septum; style filiform, exserted; pollen presenter ellipsoid, obscurely 2-lobed. **Fruit** an oblong or fusiform capsule, with loculicidal dehiscence. **Seeds** many; testa produced into membranous wings. $x = 11$ (8, 21—1 report each).

Species 20, Old World east to Sulawesi; 1 in sthn Afr.: *Hymenodictyon parvifolium* Oliv. subsp. *parvifolium*, Northern Province.

Hyperacanthus E.Mey. ex Bridson 8285040

(Ixoroideae—Gardenieae—Gardeniinae)
Bridson: 275 (1985). Bridson & Robbrecht: 275 (1985).

Gardenia J.Ellis in part.

Shrubs or small trees with both spines and brachyblasts present or 0. **Leaves** opposite, but may appear fascicled due to congestion, shortly petiolate, glabrous; domatia 0; stipules intrapetiolar, ovate, tightly inrolled and seldom persisting beyond apical node. **Flowers** borne in 1 axil near apex of lateral branches or brachyblasts, either solitary or up to 3 on a common peduncle, or peduncle almost obsolete; pedicels almost obsolete; bracts paired, ovate. **Calyx** with tube oblong-ovate, limb well developed, tubular, divided into triangular teeth near apex, inside pubescent, at least near apex and with colleters present near apex. **Corolla** 5(6)-lobed, white, often streaked with pink or red outside, usually salver-shaped; lobes elliptic to broadly elliptic, spreading, puberulous on both faces, contorted; tube narrowly cylindrical, slightly widened at apex, glabrous or pubescent outside, with a patch of hairs near midpoint inside. **Stamens** 5(6); anthers linear, sessile, attached near middle of corolla tube, partly exserted. **Disc** usually annular. **Ovary** 2-locular; ovules many; style narrowly cylindrical, glabrous, somewhat shorter than or ± equalling corolla tube in length; stigma exserted or sometimes included, bifid, with 2 ovate lobes normally cohering. **Fruit** spherical to fusiform, thin-walled, unilocular; calyx limb persistent. **Seeds** many, embedded in fleshy placental tissue; testa thin, reticulate, often rugulose.

Species 2, tropical Africa: *Hyperacanthus amoenus* (Sims) Bridson, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape, *H. microphyllus* (K.Schum.) Bridson, northern part of KwaZulu-Natal.

Keetia E.Phillips 8352050

(Antirheoideae—Vanguerieae)
Phillips: 587 (1926); Phillips: 369 (1927); Bridson: 967 (1986); Bridson: 362 (1998).

Climbers or scandent shrubs; stems glabrous or frequently pubescent. **Leaves** paired, petiolate; stipules lanceolate to ovate or triangular at base, acuminate to linear above. **Flowers** in pedunculate, usually distinctly

branched cymes; bracts and bracteoles often conspicuous. **Calyx** with tube ellipsoid to ovoid; limb equalling or sometimes longer than tube, dentate. **Corolla** white; lobes oblong-lanceolate to ovate, reflexed, acute and thickened at apex; tube cylindrical with a ring of deflexed hairs inside. **Stamens** 5, arising at throat of corolla; anthers narrowly ovate or oblong, fully or partly exserted. **Disc** pubescent. **Ovary** 2-locular, with a single, pendulous ovule in each locule; style long-exserted; pollen presenter ovoid, narrowly winged, bifid at apex. **Fruit** a 2-seeded drupe, slightly to strongly bilobed, sometimes 1-seeded by abortion and asymmetrical.

Species 40, tropical Africa; 1 in sthn Afr.: *Keetia gueinzii* (Sond.) Bridson, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Kohautia Cham. & Schltdl. 8136060

(Rubioideae—Hedyotideae)

Chamisso & Schlechtendal: 156 (1829); Sonder: 8 (1865) under *Hedyotis*; Phillips: 722 (1951) under *Oldenlandia*; Bremekamp: 56 (1952); Verdcourt: 228 (1976); Mantell: 85 (1989).

Annual or perennial herbs or sometimes subshrubs, with subterete or quadrangular branches. **Leaves** opposite, sessile, usually linear, mostly 1-nerved; stipules with 2–several fimbriae or rarely reduced to a simple lobe. **Flowers** never heterostylous; in terminal corymbs or panicles, rarely solitary; bracts slender or filamentous. **Calyx** 4(5)-partite; segments ovate-triangular to subulate. **Corolla** 4(5)-lobed; lobes suberect or spreading, papillose above; cream, shades of brown, white or pinkish mauve; tube slender, cylindric below, slightly expanded towards mouth, with flattened, obtuse hairs within. **Stamens** included or only anther tips exserted; anthers sessile. **Ovary** 2-locular, with many ovules in each locule, attached to shield-like, shortly-stalked placentas attached below middle of central partition; style usually much shorter, but sometimes only slightly lower than anthers; stigma simple or bifid. **Capsule** bilocular, globose or ellipsoid, scarcely beaked. **Seeds** many, angular, somewhat alveolate. $x = 9$ (polyploidy).

Species 60, Old World tropics; 15 in sthn Afr., absent from Western Cape.

Kraussia Harv. 8308010

(Ixoroideae—Octotropideae)

Harvey: 21 (1842); Sonder: 22 (1865) in part; Phillips: 728 (1951); Bridson & Verdcourt: 700 (1988).

Shrubs. **Leaves** petiolate, oblong or somewhat lanceolate, obtuse to acuminate; stipules triangular, acuminate. **Flowers** pedunculate; in simple, axillary, bracteolate cymes. **Calyx**: limb divided nearly to base into 4–6 triangular lobes; lobes rounded to acute; tube shallowly campanulate, glabrous to puberulous. **Corolla** 5-lobed, white; lobes oblong-elliptic, longer than tube; tube campanulate, villous within. **Stamens** 5, arising in corolla mouth, exserted; anthers subsessile, dorsifixed, linear, connective distinctly apiculate. **Disc** annular. **Ovary** 2-locular, with 1 or 2 pendulous ovules in each locule, from placentas attached near top of septum; style short, thick, cylindric, glabrous; stigmatic club long, fusiform, with 10 membranous, narrow, undulate, ciliate wings, exserted. **Fruit** globose, ± size of pea, somewhat fleshy, 2-locular, with many, succulent, red granules; calyx limb persistent. **Seeds** 2–6, ± ovoid, usually with 1 flattened face, finely reticulate. $x = 11$ (1 report).

Species 3, tropical Africa; 1 in sthn Afr.: *Kraussia floribunda* Harv., Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Lagynias E.Mey. ex Robyns 8351060

(Antirheoideae—Vanguerieae)

Meyer: 159 (1843); Robyns: 312 (1928); Sonder: 13 (1865) under *Vangueria*; Phillips: 731 (1951); Verdcourt & Bridson: 761 (1991); Bridson: 238 (1998).

Ancylanthos Desf. in part, as to *A. monteiroi* Oliv.; Pooley: 478 (1993).

Shrubs or small trees. **Leaves** petiolate, oblong, elliptic or lanceolate-elliptic, usually paler on undersurface; stipules shortly connate at base, shortly subulate, villous within, soon falling. **Flowers** in few- to many-flowered, dichotomously branched, axillary cymes, or terminating short, lateral shoots; peduncles short; pedicels mostly elongate. **Calyx** deeply 5-lobed; lobes usually almost as long as or longer than tube, elongate-spathulate or narrowly oblong-spathulate, obtuse; tube short, subglobose. **Corolla** 5-lobed, yellow, glabrous or hairy; lobes elongate, acuminate or acute, reflexed; tube cylindric to campanulate, with ring of deflexed hairs near base within, glabrous or sparsely hairy at throat. **Stamens** 5, arising in corolla mouth, exserted; filaments shorter than anthers; anthers apiculate. **Disc** annular, tumid. **Ovary** 5-locular, with a single pendulous ovule in each locule; style filiform, usually exserted; stigma broadly cylindric, sulcate, shortly 5-lobed. **Fruit** a drupe varying in shape according to number (1–5) of pyrenes developed; pyrenes asymmetrically ellipsoid, pyriform or subglobose with woody walls. $x = 11$ (high polyploidy).

Species 4, tropical Africa; 3 in sthn Afr., Northern Province and KwaZulu-Natal.

Leptactina Hook.f. 8274000

(Ixoroideae—Pavetteae)

Hooker: t. 1092 (1871); Hiern: 87 (1877); Hallé: 70 (1970); Bridson & Verdcourt: 688 (1988).

Shrubs. **Leaves** petiolate, usually lanceolate; usually with distinct, pubescent domatia; stipules broadly ovate, conspicuous. **Flowers** in few- to many-flowered, terminal, sessile or subsessile cymes. **Calyx** hairy; tube cylindric or campanulate, equalling ovary; lobes linear-lanceolate, contorted, with short, fleshy setae at base. **Corolla** 5-lobed, white, hairy; lobes lanceolate, shorter than tube, contorted; tube long, cylindric, ± hairy in throat. **Stamens** 5, arising deep in corolla throat, included, or apex of anthers exserted; anthers sessile, linear, sometimes acuminate. **Ovary** 2-locular, with many ovules in each locule on placentas attached to septum; style linear, usually with pollen-collecting hairs at level of anthers; stigma 2-lobed, lobes linear, usually included. **Fruit** indehiscent, ovoid, scarcely or slightly fleshy, often longitudinally ribbed, many-seeded. **Seeds** angular, smooth and glossy, with a hilar pit. $x = 9, 11$ (1 report each).

Species 25, tropical Africa; 1 in sthn Afr.: *Leptactina delagoensis* K.Schum. subsp. *delagoensis*, Northern Province and KwaZulu-Natal.

Mitriostigma Hochst. 8283090

(Ixoroideae—Gardenieae—Gardeniinae)

Hochstetter: 235 (1842); Hiern: 111 (1877); Bridson & Verdcourt: 539 (1988).

Randia L. in part; Sonder: 7 (1865).

Shrubs or small trees. **Leaves** petiolate, elliptic, membranous; stipules green in dry state, ovate acuminate. **Flowers** in small, axillary, bracteolate cymes. **Calyx** 5-lobed, lobes subulate; tube campanulate. **Corolla** white; lobes short, rounded, dextrorsely contorted; tube elongate, narrowly campanulate or funnel-shaped. **Stamens** 5, arising in broad part of corolla tube, included or nearly so; anthers sessile, linear, dorsifixed. **Disc** cush-

ion-like. **Ovary** 2-locular, or falsely 1-locular, with several subpendulous ovules in each locule; style filiform, glabrous; stigmatic club included or exserted, bifid at apex. **Fruit** a globose to ellipsoid berry, crowned by persistent calyx limb. **Seeds** somewhat compressed or not, fleshy; testa ornamented with fine narrow reticulations. $x = 11$.

Species 5, tropical Africa; 1 in sthn Afr.: *Mitriostigma axillare* Hochst., KwaZulu-Natal and Eastern Cape.

Nenax Gaertn. 8439000

(Rubioideae—Anthospermeae)

Gaertner: 165 (1788); Hooker: 140 (1873); Schumann: 129 (1891); Phillips: 736 (1951); Puff: 37 (1986a).

Dwarf shrubs, dioecious, mostly many-stemmed and often much and intricately branched, with thick woody roots. **Leaves** decussate or (rarely) in whorls of 3 but often seemingly in much larger numbers at nodes, small and often ± ericoid, ± acute, acuminate to mucronate at apex; stipular sheaths (sub)sessile, small, ± cup-shaped, with or without 1(–3) minute setae on either side. **Inflorescence** frequently leafy and inconspicuous, made up of subsessile, mostly 3–1-flowered cymes, arranged in pairs, or single at nodes, or flowers solitary and terminal on shoots. **Flowers** subsessile, subtended by a pair of leafy bracts, 4- or 5(6)-merous. **Calyx** with lobes small or subobsolete. **Male flowers**: corolla with tube short, ± cylindrical to broadly funnel-shaped, lobes recurved, ± lanceolate; anthers yellowish to whitish, exserted, dangling on long, slender, filiform filaments; minute rudimentary ovary usually present. **Female flowers**: corolla much smaller; tube cylindrical, lobes linear to ± lanceolate, erect to ± spreading. **Ovary** 2-locular; ovule 1 per locule, erect, from base of locule; style 0; stigmas 2, long-exserted, hairy, often purplish red. **Fruit** crowned by persistent calyx lobes, sometimes supported by a small ± U-shaped carpophore, dehiscent, occasionally ± inflated, or hard, indehiscent, without carpophore. $x = 11$ (aneuploids).

Species 9, endemic in sthn Afr., S Namibia, North-West, Free State, Lesotho, Northern, Western and Eastern Cape.

Oldenlandia L. 8136200

(Rubioideae—Hedyotideae)

Linnaeus: 119 (1753); Sonder: 8 (1865) under *Hedyotis*; Phillips: 722 (1951); Bremekamp: 183 (1952); Verdcourt: 268 (1976); Verdcourt: 120 (1989).

Annual or perennial herbs, rarely subshrubs; stems erect or prostrate, simple or branched. **Leaves** attached to stipular sheath at base; stipules with 1–several fimbriae. **Flowers** heterostylous or isostylous; usually in terminal clusters. **Calyx** 4-partite, equal, narrowly to broadly triangular. **Corolla** 4-lobed, white; usually with short tube, bearded in throat. **Stamens** 4, included or exserted; with glabrous or rarely papillose filaments; anthers dorsifixed, sometimes subsessile. **Ovary** 2-locular, with many ovules in each locule on shortly stalked placentas; style included or exserted, glabrous or minutely hairy; stigma lobes linear to subglobose. **Fruit** a subglobose to oblong capsule, usually with loculicidal dehiscence. **Seeds** usually many, subglobose or angled, becoming slimy when moistened; testa cells smooth to distinctly punctate, granular or tuberculate. $x = 9$ (11) (aneuploids, high polyploidy).

Species 300, tropical regions, especially Africa; 13 in sthn Afr., absent from Northern and Western Cape.

Otiophora Zucc. 8450000

(Rubioideae—Hedyotideae)

Zuccarini: 315 (1832); Phillips: 737 (1951); Verdcourt: 315 (1976); Puff: 310 (1981); Puff: 142 (1989).

Perennial herbs or shrublets, often branched from a woody rootstock. **Leaves** opposite or ternate, sessile, lanceolate, usually hairy; stipular sheaths ± cup-shaped, with linear setae or fimbriae on either side, median often (much) longer than others. **Flowers** not heterostylous, paired, on short, persistent pedicels, in head- or spike-like inflorescences, elongating in fruit. **Calyx** 5-lobed, persistent; 1–3 lobes elongated and foliaceous, others minute. **Corolla** 5-lobed, white to light red, usually glabrous; lobes linear-lanceolate, much shorter than tube; tube narrowly cylindric, sometimes bearded in throat. **Stamens** (4)5, arising in throat of corolla, exserted; filaments slender; anthers oblong, dorsifixed. **Ovary** 2-locular, with a single erect ovule in each locule, attached near base; style filiform, bilobed, exserted; stigmas smooth, filiform. **Fruit** usually splitting into 2 mericarps, crowned with persistent calyx. $x \approx 9$ (aneuploids, polyploidy).

Species 20, tropical Africa and Madagascar; 2 in sthn Afr., Northern Province, North-West, Mpumalanga, Gauteng, Swaziland and KwaZulu-Natal.

Oxyanthus DC. 8293000

(Ixoroideae—Gardenieae—Gardeniinae)

Candolle: 218 (1807); Sonder: 3 (1865); Hooker: 91 (1873); Hiern: 106 (1877); Phillips: 727 (1951); Hallé: 186 (1970); Bridson & Verdcourt: 526 (1988).

Shrubs or small trees. **Leaves** often large, petiolate; domatia often present as hairy tufts in nerve axils; stipules green in dry state, ovate, deciduous. **Flowers** in dense, axillary racemes or panicles. **Calyx** 5-lobed; lobes subulate, linear or ovate, ± as long as tube; limb with distinct tubular part; tube campanulate or turbinate-oblong, sometimes truncate. **Corolla** 5-lobed, white, glabrous; lobes narrowly elliptic or lanceolate, acuminate, contorted; tube long cylindric, sometimes somewhat filiform, hairy within. **Stamens** 5, arising in corolla mouth, usually exserted; anthers linear, sessile, with curved or straight apiculus, sometimes bluntly sagittate. **Disc** annular, cushion-like. **Ovary** 1- or 2-locular, with many ovules; style filiform, exserted; stigma usually fusiform or clavate, or elliptic, usually bifid. **Fruit** baccate, ellipsoid or ovoid, many-seeded, rarely with a single seed in each locule. **Seeds** somewhat compressed, often transversely oblong, striate. $x = 11$.

Species 40; 4 in sthn Afr.: *Oxyanthus latifolius* Sond. and 3 subspecies of 2 other species, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Pachystigma Hochst. 8359000

(Antirheoideae—Vanguerieae)

Hochstetter: 234 (1842); Sonder: 13 (1865) under *Vangueria*; Robyns: 117 (1928); Verdcourt & Bridson: 764 (1991); Bridson: 241 (1998).

Shrublets, sometimes rhizomatous with a strong rootstock. **Leaves** opposite, rarely in whorls of 3, shortly petiolate; stipules connate at base, villous within, often at length deciduous. **Flowers** in simple, axillary cymes, rarely fasicled; bracts and bracteoles present. **Calyx** 5-partite; segments triangular or linear, obtuse, often foliaceous, sometimes exceeding corolla tube. **Corolla** 5-lobed, green or greenish yellow to greenish white, glabrous or hairy; lobes variable, reflexed, often apiculate; tube shortly and broadly cylindric, with ring of deflexed hairs inside, throat usually slightly hairy. **Stamens** 5,

arising in corolla mouth, exserted; filaments usually shorter than anthers; anthers lanceolate, sometimes apiculate. **Disc** annular, tumid. **Ovary** (4)5-locular with a single pendulous ovule in each locule; style slender, terete, exserted; stigmatic knob shortly and broadly cylindric, often sulcate, obscurely (4)5-lobed. **Fruit** a globose or obovoid drupe, with 2–5 pyrenes, crowned by persistent calyx limb. $x \approx 11$ (aneuploids).

Species 10, warm parts of Africa; 10 in sthn Afr., Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal and Eastern Cape.

Paederia L. 8430000

(Rubioideae—Paederieae)

Linnaeus: 7 (1767) name conserved; Verdcourt: 175 (1976); Puff: 1 (1986a); Puff: 63 (1989).

Straggling or climbing shrubs, usually fetid. **Leaves** opposite or in whorls of 3, petiolate, ± cordate, thin; stipules intrapetiolar, ovate to narrowly triangular, deciduous. **Flowers** usually pedicellate, in axillary and terminal pedunculate clusters, or solitary. **Calyx** 5-lobed; lobes subulate, elongate, recurving, persistent; tube campanulate or ovoid. **Corolla** white, salver-shaped, aestivation valvate; tube cylindric, longer than calyx, at length splitting at base. **Stamens** 5, arising in or near mouth of corolla tube; filaments short. **Disc** small. **Ovary** 2- or 3-locular, with a solitary, erect ovule in each locule; style filiform; stigma lobes 2 or 3, filiform, included or exserted. **Fruit** dorsally compressed or 3-sided; epicarp membranous, shiny, bursting in a valvate manner from base; pyrenes 2 or 3, compressed. **Seeds** same shape as pyrenes and intimately associated with them. $x = 11$ (aneuploids, high polyploidy).

Species 20, tropical regions; 1 in sthn Afr.: *Paederia bojeriana* (A.Rich.) Drake subsp. *foetens* (Hiern) Verdc., Northern Province.

Pavetta L. 8383000

(Ixoroideae—Pavetteae)

Linnaeus: 110 (1753); Linnaeus: 48 (1754); Sonder: 19 (1865); Bremekamp: 1 (1934); Bridson & Verdcourt: 619 (1988).

Shrubs or small trees, occasionally suffrutices. **Leaves** opposite, rarely ternate, sessile or petiolate; with some bacterial nodules usually at branching of veins; stipules with a triangular to truncate limb, connate at base or up to entire length, bearing a subulate arista, or less often a short mucro, sometimes with silky hairs within. **Flowers** usually clustered in corymbs, umbels or heads, rarely in panicles, very rarely solitary. **Calyx** 4(5)-toothed or 4(5)-lobed, sometimes nearly truncate, rarely accrescent; tube usually saucer-shaped. **Corolla** 4(5)-lobed, white, glabrous; lobes somewhat variable in shape, shorter than tube; tube cylindrical to funnel-shaped, throat bearded or pubescent to glabrous. **Stamens** 4(5), arising in corolla mouth, exserted; filaments shorter than anthers; anthers linear to oblong, acuminate or apiculate, usually sagittate. **Disc** annular, fleshy. **Ovary** 2-locular, with a solitary pendulous ovule (rarely 2) in each locule; style slender, exserted, twice as long as corolla, apical part thickened to club-shaped, shortly hairy, acting as pollen presenter, stigmatic surface confined to bidentate apex. **Fruit** a spherical, slightly 2-lobed drupe, with 1(2) chartaceous pyrenes. **Seeds** semiglobose. $x = 11$ (high polyploidy).

Species 400, Old World tropics; 21 in sthn Afr., widespread, absent from S Namibia, Northern and Western Cape.

Pentanisia Harv. 8348000

(Rubioideae—Knoxieae)

Harvey: 21 (1842); Sonder: 24 (1865); Hooker: 104 (1873); Hiern: 131 (1877); Phillips: 729 (1951); Verdcourt: 233 (1952); Verdcourt: 167 (1976); Verdcourt: 57 (1989).

Perennial herbs, with woody rootstock. **Leaves** opposite or rarely in whorls of 3, sessile or shortly petiolate, linear to round; stipules 3–5-fid or setose, adnate to petiole, persistent. **Flowers** dimorphic, some flowers with anthers included and style exserted and others completely vice versa; in terminal, pedunculate, spikes or heads. **Calyx** hairy, persistent, 3–5-lobed, 1–3 lobes foliaceous and others small or 0; tube shallow. **Corolla** 5-lobed, blue, hairy; lobes oblong, apiculate, shorter than tube; tube cylindric, becoming campanulate above, villous within. **Stamens** 4 or 5, arising deep in corolla tube; filaments ± as long as linear anthers. **Disc** annular. **Ovary** 2-locular, with a solitary pendulous ovule in each locule; style filiform; stigma of 2 filiform arms. **Fruit** dry, globular, slightly lobed, ovoid or compressed-obcordate, indehiscent or tardily dehiscent into cocci, or subglobose and rather succulent. **Seeds** small, compressed. $x = 10$ (aneuploids, polyploidy).

Species 15, tropical Africa; 3 in sthn Afr., Northern Province, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho and Eastern Cape.

Pentas Benth. 8154000

(Rubioideae—Hedyotideae)

Bentham: t. 4086 (1844); Hiern: 45 (1877); Verdcourt: 237 (1953); Verdcourt: 66 (1989).

Perennial herbs or subshrubs; stems erect or straggling from a fibrous or woody rootstock. **Leaves** paired or whorled, usually lanceolate, elliptic or linear; stipules multipartite, segments colleter-tipped. **Flowers** mono-, di- or trimorphic; usually in dense, complex cymes. **Calyx** 5-lobed; lobes equal or unequal, some accrescent in fruit; tube campanulate-turbinate. **Corolla** 5-lobed, white; lobes equal or somewhat unequal; tube cylindric or ± funnel-shaped, sometimes campanulate above, bearded in throat. **Stamens** 5; in monomorphic flowers enclosed in an abrupt apical dilation of tube and style exserted; in dimorphic flowers tube gradually dilated at apex in short-styled flowers, and abruptly dilated in long-styled flowers. **Disc** present, sometimes becoming obconic. **Ovary** 2-locular, with many ovules in each locule attached to semiglobose placentas on septum; style filiform; stigma of 2 glandular, terete lobes, or thickened and terete. **Fruit** a 2-valved, ribbed, beaked capsule, opening at apex into 4 valves; sometimes separating into 2 cocci. **Seeds** usually subglobose, often 3-winged, reticulate or honeycombed. $x = 10$ (9) (polyploidy).

Species 34, Africa to Arabian Peninsula and Madagascar; 2 in sthn Afr.: Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Pentodon Hochst. 8136180

(Rubioideae—Hedyotideae)

Hochstetter: 551 (1844); Phillips: 722 (1951); Bremekamp: 175 (1952); Verdcourt: 263 (1976); Verdcourt: 116 (1989).

Soft, straggling herbs in damp places. **Leaves** paired, sessile, lanceolate; stipules with short sheath, divided into 2–5 narrow fimbriae. **Flowers** dimorphic or not, in panicles or cymes; bracts subulate. **Calyx** persistent, 5-lobed; lobes lanceolate; tube shallowly campanulate. **Corolla**: tube funnel-shaped, densely villous within; lobes 5, ovate, shorter than tube, hairy on face. **Stamens** 5, arising ± in middle of corolla tube, included; anthers linear, subsessile. **Disc** 0. **Ovary** 2-locular, with many

ovules in each locule attached to shortly stalked, shield-like placentas; style terete, exserted, glandular on lower half; stigma of 2 linear, glandular lobes. **Fruit** an ovoid-globose, smooth capsule. **Seeds** not becoming slimy when moistened, with swelling in lateral walls of testa cells. $x = 9$ (1 report).

Species 2, warm and tropical America, Africa, Arabian Peninsula, Seychelles; 1 in sthn Afr.: *Pentodon pentandrus* (Schumach. & Thonn.) Vatke, N Namibia, Botswana, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Phylohydrax Puff 8467000

(Rubioideae—Spermacoceae)

Puff: 362 (1986b); Sonder: 25 (1865) as *Hydrophylax*; Phillips: 737 (1951) as *Hydrophylax*; Verdcourt: 162 (1989).

Perennial succulent herbs with long, creeping stems bearing ± short upright branches; stems frequently rooting at nodes. **Leaves** sessile, decussate, ovate or ovate-lanceolate, mostly obtuse at apex; stipule sheath cupular, toothed. **Flowers** heterostylous; sessile, axillary, solitary or in pairs. **Calyx** irregularly lobed, ± lacerate, persistent in fruit. **Corolla** 4-lobed, white or pinkish tinged on outside; lobes lanceolate or linear-lanceolate; tube funnel-shaped, with a ring of hairs below throat. **Stamens** 4, arising in corolla mouth, exserted; filaments shorter than anthers; anthers linear or linear-oblong, exserted. **Ovary** 2-locular, with a single ovule in each locule; ovule attached near base of septum; style slender, subexserted, divided ± halfway into linear branches; stigmas hairy. **Fruit** indehiscent, 1- or 2-locular, 1- or 2-seeded, ellipsoid to oblong-ovoid, laterally compressed, faintly ribbed, small and largely hidden in stipular sheath. **Seeds** ± ellipsoidal, minutely granulate.

Species 2, tropical Africa and Madagascar; 1 in sthn Afr.: *Phylohydrax carnosa* (Hochst.) Puff, along the seashores of KwaZulu-Natal, the Eastern and Western Cape up to Mossel Bay.

Plectroniella Robyns 8352010

(Antirheoideae—Vanguerieae)

Robyns: 243 (1928); Phillips: 732 (1951); Bridson: 337 (1998).

Shrubs or small trees, spinescent. **Leaves** shortly petiolate, elliptic or lanceolate; stipules small, subulate. **Flowers** in axillary, corymbose cymes. **Calyx** saucer-shaped, 4-toothed. **Corolla** 4-lobed, white, glabrous; lobes oblong, slightly longer than tube; tube campanulate, with deflexed hairs in throat. **Stamens** 4, arising in corolla mouth, exserted; filaments shorter than anthers. **Disc** annular, tumid. **Ovary** 3-locular, with a single pendulous ovule in each locule; style exserted; stigma subglobose, shortly 3-lobed. **Fruit** a subglobose drupe, usually with 1 locule aborted. **Seeds** ± ellipsoid.

Species 2, tropical Africa; 2 in sthn Afr., Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Psychotria L. 8399000

(Rubioideae—Psychotrieae)

Linnaeus: 929 (1759); Hiern: 215 (1877); Phillips: 735 (1951); Verdcourt: 26 (1976); Verdcourt: 9 (1989).

Grumilea Gaertn.: 138 (1788).

Shrubs or small trees. **Leaves** petiolate, elliptic or elliptic-lanceolate or obovate; stipules lanceolate or ovate, caducous; colleters present. **Flowers** sessile or pedicellate, in panicles or terminal cymes. **Calyx** glabrous, persistent; tube saucer- or cup-shaped with minute teeth. **Corolla** 5-lobed, white, greenish white or yellow, glabrous; lobes reflexed, somewhat shorter than tube, valvate; tube campanulate or cylindric, hairy at throat. **Stamens** 5, arising in middle of corolla tube, slightly exserted; filaments ± as long as anthers; anthers linear or oblong, glabrous or pilose. **Disc** hemispherical. **Ovary** 2-locular, with a single erect ovule in each locule; style filiform, long or short; stigma bifid, lobes linear. **Fruit** an oval drupe, with 1 or 2(–4) pyrenes. $x = 11$ (high polyploidy).

Species ± 1400, tropical regions; 2 in sthn Afr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Psydrax Gaertn. 8352030

(Antirheoideae—Vanguerieae)

Gaertner: 125 (1788); Candolle: 476 (1830) in part; Bridson: 692 (1985); Verdcourt & Bridson: 892 (1991); Bridson: 345 (1998).

Mitrastigma Harv.: 20 (1842).

Small trees or shrubs. **Leaves** opposite or rarely ternate, petiolate or sometimes subsessile; stipules usually with a truncate to triangular base bearing a decurrent, slightly to very strongly keeled, sometimes foliaceous lobe, or less often lanceolate to ovate and soon caducous. **Flowers** borne in sessile to pedunculate, clearly branched, umbellate cymes, or very rarely solitary; bracts and bracteoles usually inconspicuous. **Calyx** with tube broadly ellipsoid; limb a truncate to dentate rim. **Corolla** 5-lobed, white to yellow; lobes reflexed, usually obtuse to acute; tube cylindrical, inside usually with a ring of deflexed hairs. **Stamens** 5, arising at corolla throat; filaments well developed; anthers lanceolate to narrowly ovate, attached shortly above base, reflexed. **Ovary** 2-locular, with 1 ovule per locule; style long, slender, exserted; stigmatic knob cylindrical, always longer than wide. **Fruit** an ellipsoid to didymous drupe; pyrenes ellipsoid and flattened on ventral face.

Species ± 100, Old World tropics; 4 in eastern regions of sthn Afr., absent from S Namibia, North-West, Northern and Western Cape.

Pygmaeothamnus Robyns 8351020

(Antirheoideae—Vanguerieae)

Robyns: 29 (1928); Sonder: 13 (1865) under *Vangueria*; Phillips: 730 (1951); Verdcourt & Bridson: 776 (1991); Bridson: 307 (1998).

Perennial herbs, with several to many stems from a woody rootstock. **Leaves** opposite or in whorls of 3 or 4, shortly petiolate, oblanceolate or oblong, glabrous or with sparse bristly hairs on both surfaces; stipules triangular, connate at base, usually shortly subulate at apex. **Flowers** in simple or branched cymes or fascicles, sometimes borne at lower, often leafless nodes; bracts small. **Calyx** 5-lobed; lobes unequal, oblong, sometimes reduced to teeth; tube short. **Corolla** 4- or 5-lobed, white, cream or greenish white; lobes ovate or oblong-lanceolate sometimes apiculate, as long as or longer than tube; tube broadly cylindric, sometimes short, with a ring of long, reflexed hairs; sparsely to densely pilose at throat. **Stamens** 4 or 5, arising in mouth of corolla; filamens shorter than anthers; anthers just exserted, oblong, shortly mucronate. **Disc** usually annular. **Ovary** 2-locular, with a single pendulous ovule in each locule; style terete or linear, slightly exserted; stigmatic knob cylindric or subcapitate, deeply 2-lobed. **Fruit** globose or obpyriform, didymous or asymmetrical, containing (1)2 pyrenes.

Species 4, tropical Africa; 2 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal and Eastern Cape.

Pyrostria Comm. ex Juss. 8355000

(Antirheoideae—Vanguerieae)

Jussieu: 206 (1789); Candolle: 464 (1830) in part; Hooker: 111 (1873); Schumann: 94 (1891); Bridson: 623 (1987); Bridson: 340 (1998).

Shrubs or small trees, becoming somewhat spinescent; branchlets ± at right angles to branches. **Leaves** shortly petiolate, elliptic; stipules aristate, deciduous. **Flowers**

solitary or fascicled on short pedicels. **Calyx** 4-lobed, lobes triangular. **Corolla** 4-lobed, white or yellowish white; lobes oblong-elliptic, apiculate, valvate; tube somewhat globose, densely bearded in throat. **Stamens** 4, arising in corolla throat; anthers subsessile, ovate. **Disc** semiglobose. **Ovary** 2-locular, with a single pendulous ovule in each locule; stigmatic knob subglobose, obscurely 2-lobed. **Fruit** a subspherical to heart-shaped, bilaterally flattened drupe; pyrenes narrowly obovoid to obovoid with ventral face flattened and apex somewhat crested. **Seeds** with testa finely reticulate.

Species 10, Africa, Madagascar and Mauritius; 1 in sthn Afr.: *Pyrostria hystrix* (Bremek.) Bridson, Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

*Richardia L. 8464000

(Rubioideae—Spermacoceae)

Linnaeus: 330 (1753); Linnaeus: 153 (1754); Phillips: 737 (1951); Lewis & Oliver: 273 (1974); Verdcourt: 190 (1989).

Richardsonia Kunth: 43 (1818).

Annual or perennial herbs, hairy; stems erect or prostrate. **Leaves** sessile or shortly petiolate, usually ovate, lateral nerves evident; stipule sheath connate with petioles, bearing several fimbriae. **Flowers** in dense, terminal heads, surrounded by an involucre of leaves which are several-nerved from base. **Calyx** 4–8-lobed; lobes lanceolate, ovate or subulate, persistent; tube turbinate or subglobose. **Corolla** 3–5-lobed, white; lobes ovate or lanceolate; tube shortly funnel-shaped. **Stamens** 3–5, arising in corolla throat; filaments filiform; anthers linear or oblong, exserted. **Ovary** 3- or 4-locular with a solitary erect ovule in each locule attached near middle of septum; style filiform, exserted; stigmas 3 or 4, linear or spathulate. **Fruit** a capsule, separating into cocci, crowned with persistent calyx; cocci muricate or papillose, rarely smooth. **Seeds** oblong-ellipsoid or obovoid, convex on back. $x = 7$ (8) (1 report, polyploidy).

Species 15, tropical America; 4 naturalised in eastern regions of sthn Afr., absent from Namibia, Botswana, Northern and Western Cape.

Rothmannia Thunb. 8285010

(Ixoroideae—Gardenieae—Gardeniinae)

Thunberg: 65 (1776); Phillips: 726 (1951); Bridson & Verdcourt: 511 (1988).

Gardenia Ellis sect. *Rothmannia* (Thunb.) Endl.: 562 (1838); Sonder: 4 (1865).

Unarmed shrubs or small trees. **Leaves** opposite or occasionally ternate, petiolate, elliptic; stipules ovate, hairy within. **Flowers** solitary, sessile. **Calyx** with tube usually turbinate to cylindrical; limb tube velvety inside; lobes present or 0, erect. **Corolla** 5-lobed, white with maroon streaks or speckles; lobes obovate-oblong; tube cylindric below, campanulate above, hairy within lower portions. **Stamens** 5, arising in corolla mouth, subexserted; anthers sessile, linear. **Disc** tumid. **Ovary** 1-locular, with 2 parietal placentas opposite each other and sometimes partially fused; ovules many; style glabrous, linear, exserted; pollen presenter narrowly fusiform to club-shaped with stigmatic surface confined to shortly bilobed apex. **Fruit** globose, sometimes crowned with persistent calyx limb. **Seeds** many, smooth, embedded in pulpy placental tissue, forming a solid mass. $x = 11$.

Species 40, tropical Africa, Asia and Seychelles; 3 in eastern regions of sthn Afr., absent from Namibia, Free State, Lesotho, Northern and Western Cape.

Rubia L. 8489000

(Rubioideae—Rubieae)

Linnaeus: 109 (1753); Linnaeus: 47 (1754); Sonder: 34 (1865); Phillips: 739 (1951); Puff: 61 (1986a); Puff: 193 (1989).

Scrambling, creeping or climbing perennial herbs, somewhat woody near base; roots somewhat woody, reddish (yielding a red dye); stems branched, 4-angled, ± brittle, mostly beset with recurved prickles. **Leaves** and stipules similar, in whorls of 4–8(–12), petiolate; blades cordate or broadly ovate, ovate-lanceolate to linear, rounded to ± cordate at base or narrowed to base, with 1–5(–7) prominent veins. **Flowers** in axillary and/or terminal cymes, bisexual, (4)5(6)-merous. **Calyx** with lobes obsolete. **Corolla** rotate to subcampanulate, greenish, yellowish green to yellow; lobes ± triangular, (long-)acuminate. **Stamens**: anthers exserted. **Ovary** crowned by a minute disc; 2-locular, 1 ovule in each chamber arising on septum; style branches 2, joined below; stigmas capitate. **Fruit** fleshy, glabrous, consisting of 2 round mericarps, each with a single seed, round on dorsal side, plane to convex on ventral side; one mericarp often aborted. $x = 11$ (B-chromosomes, high polyploidy).

Species 60, Africa, temperate Asia, America; 3 in sthn Afr., widespread.

Rytigynia Blume 8351040

(Antirheoideae—Vanguerieae)

Blume: 178 (1850); Robyns: 132 (1928); Phillips: 731 (1951); Verdcourt: 145 (1987); Verdcourt & Bridson: 802 (1991); Bridson: 284 (1998).

Shrubs or small trees, occasionally somewhat scrambling. **Leaves** opposite or occasionally in whorls of 3, petiolate; often with domatia in axils of nerves beneath; stipules connate at base, oblong or triangular, villous within, often ± persistent, ending in a linear or subulate, ± deciduous appendage. **Flowers** axillary, solitary or in 2–10(–15)-flowered, sometimes umbel-like cymes; peduncles and pedicels mostly well developed; bracts and sometimes bracteoles present, small. **Calyx** with tube ± subglobose; limb short, truncate or shortly toothed. **Corolla** 5-lobed, white, cream, yellowish or greenish; lobes shorter than to longer than tube, acute to very distinctly long-apiculate or with a filiform appendage; tube cylindric, glabrous or hairy with a ring of deflexed hairs in middle. **Stamens** 5, slightly to distinctly exserted; anthers often mucronate or slightly appendaged, often papillate; filaments very short. **Disc** depressed, glabrous. **Ovary** 2–5(6)-locular; ovules 1 per locule, pendulous, attached to upper part of septum; style usually exserted, slightly swollen at base; stigmatic knob coroniform, 2–5-lobed at apex. **Fruit** a subglobose drupe, with (2–)4 or 5 pyrenes; pyrenes narrowly ± reniform or boat-shaped, often pitted. $x = 11$ (1 report, polyploidy).

Species 70, tropical Africa; 2 in sthn Afr.: Botswana and N KwaZulu-Natal.

Sericanthe Robbr. 8308020

(Ixoroideae—Gardenieae—Diplosporinae)

Robbrecht: 27 (1978); Bridson & Verdcourt: 566 (1988).

Tricalysia A.Rich. ex DC. in part.

Shrubs or sometimes small trees. **Leaves** petiolate; usually with domatia as small tufts of hairs; bacterial nodules often present; stipules sheathing, overtopped by 2 awns, with silky hairs and colleters inside. **Flowers** subtended by 2–4 bracteolar cups, each with 2 unequal pairs of awns; 1 or more flowers opposite in axils. **Calyx** ellipsoid in bud, either open or closed with tip obtuse to

apiculate, completely covering young corolla, deeply splitting between some lobes when flower opens. **Corolla** salver-shaped, white, usually with silky indumentum outside; lobes spreading, contorted to left. **Stamens** (5–)7–9, arising at throat; anthers basifixed; connectives broadly flattened. **Disc** annular. **Ovary** 2-locular, usually with 2 ovules on a pendulous placenta in each locule. **Style** filiform, hairy or glabrous, exserted; stigma 2-lobed. **Fruit** a red, nearly spherical drupe, at first crowned by persistent calyx often withering as fruit ripens. **Seeds** either 1 per chamber and hemispherical or 2 per chamber and shaped like a quarter of a sphere; seed coat brown and striate; hilar scar apical-adaxial.

Species 17, tropical Africa; 1 in sthn Afr.: *Sericanthe andongensis* (Hiern) Robbr. var. *andongensis*, Northern Province.

*Sherardia L. 8482000

(Rubioideae—Rubieae)

Linnaeus: 102 (1753); Ball: 3 (1976).

Annual herbs; stems prostrate, 4-angled, somewhat scabrid with small, deflexed prickles. **Leaves** and stipules similar, in whorls of 4–6, sessile; lower leaves obovate-cuspidate, soon withering; upper leaves oblanceolate, mucronate. **Flowers** in heads; heads axillary, pedunculate, with up to 10 connate leaves forming an involucre, 4- to 10-flowered. **Calyx** 4- to 6-toothed, persistent in fruit. **Corolla** 4-lobed, lilac, funnel-shaped with a long tube. **Stamens** 4. **Ovary** 2-locular with a single ovule in each locule; style filiform, bifid, branches unequal; stigmas capitate. **Fruit** of 2, 1-seeded mericarps. $x = 11$.

Species 1, Europe, Mediterranean, West Asia; 1 naturalised in sthn Afr.: **Sherardia arvensis* L., Eastern Cape.

Spermacoce L. 8475000

(Rubioideae—Spermacoceae)

Linnaeus: 102 (1753); Linnaeus: 44 (1754); Phillips: 738 (1951) including *Borreria* G.Mey.; Verdcourt: 339 (1976); Verdcourt: 165 (1989).

Annual or perennial herbs, hairy or glabrous; stems prostrate to erect, 4-angled. **Leaves** opposite or falsely whorled, sessile or shortly petiolate; stipules united to form a short sheath, with 1–many, ± filiform fimbriae. **Flowers** axillary, in dense, sessile, globose masses. **Calyx** 4-lobed, usually persistent; lobes triangular, oblong or lanceolate; tube obovoid, turbinate or obconic. **Corolla** 4-lobed, white; lobes spreading, acute or obtuse, hairy or glabrous; tube slender, funnel-shaped. **Stamens** 4; filaments arising in tube or at throat; anthers linear to oblong, included or exserted. **Ovary** 2-locular; ovule 1 per locule, attached to middle of septum; style filiform, exserted, with bilobed stigma. **Fruit** usually a 2-valved capsule dehiscing from apex downwards with septum disappearing. $x = 7$ (polyploidy).

Species 100, warm regions of America; 5 in sthn Afr., not recorded in Free State, Lesotho and Western Cape.

Tarenna Gaertn. 8278000

(Ixoroideae—Pavetteae)

Gaertner: 139 (1788); Hiern: 88 (1877); Phillips: 725 (1951); Bridson & Verdcourt: 584 (1988).

Coptosperma Hook.f.: 86 (1873). *Enterospermum* Hiern: 92 (1877). *Zygoon* Hiern: 114 (1877).

Straggling to climbing shrubs. **Leaves** usually petiolate, lanceolate; stipules ovate, deciduous. **Flowers** terminal, usually in axillary, pedunculate, corymbose cymes; bracts present or 0; bracteoles present, often on pedicel. **Calyx** usually 5- or 6-lobed; lobes oblong, concave, ± as long as or somewhat shorter than cylindric tube. **Corolla** white to yellowish, glabrous or bearded in throat; lobes ± oblong, contorted; tube cylindrical, slightly shorter or longer than lobes. **Stamens** 5 or 6, arising in corolla throat, ± included; filaments linear, shorter than anthers; anthers linear, minutely apiculate, obtusely sagittate. **Disc** annular. **Ovary** 2-locular, with 1 or more ovules in each locule on fleshy placentas; style terete, ± exserted; pollen presenter narrowly spindle-shaped, bifid at apex only, rarely completely bifid. **Fruit** either 1-locular and 1-seeded or 2-locular with 1–several seeds in each locule, scarcely fleshy, usually pale green to green, white or black when mature. **Seeds** spherical with an irregular to ± regular hilar cavity; surface reticulate. $x = 11$.

Species 180, Old World tropics; 8 in sthn Afr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Tricalysia A.Rich. ex DC. 8308000

(Ixoroideae—Gardenieae—Diplosporinae)

Candolle: 445 (1830); Hooker: 95 (1873); Hiern: 117 (1877); Phillips: 727 (1951); Robbrecht: 259 (1979); Bridson & Verdcourt: 540 (1988).

Shrubs or small trees. **Leaves** petiolate, elliptic or lanceolate, glabrous or hairy; stipules sheathing, crowned by two awns. **Flowers** sessile, in several-flowered, opposite, axillary cymes; bracts present, rarely connate and enveloping calyx. **Calyx** variable, 4–6-toothed, sometimes 2-lipped; tube campanulate or saucer-shaped; with short, truncate or dentate limb tube. **Corolla** 4–7-lobed, white, cream or rose; lobes ± elliptic, shorter than or ± as long as tube, sometimes apiculate; contorted to left; tube cylindric, funnel-shaped or deeply campanulate, variably hairy or glabrous. **Stamens** 4–8, arising in corolla mouth, exserted; filaments short; anthers medifixed, linear, sometimes with apical appendage. **Disc** swollen, annular. **Ovary** 2-locular, with 1 to many ovules embedded in placenta attached to septum; style terete, exserted; stigma 2-lobed. **Fruit** drupaceous, ± pea-sized. **Seeds** ± half-moon-shaped, reticulate, sometimes pustulate. $x = 11$.

Species ± 100, tropical regions of the Old World; 7 in sthn Afr., N Namibia, N Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Vangueria Comm. ex Juss. 8351000

(Antirheoideae—Vanguerieae)

Jussieu: 206 (1789); Sonder: 13 (1865); Hooker: 111 (1873); Hiern: 146 (1877); Robyns: 273 (1928); Phillips: 729 (1951); Verdcourt & Bridson: 848 (1991); Bridson: 245 (1998).

Tapiphyllum Robyns in part, as to *T. parvifolium* (Sond.) Robyns.

Shrubs or small trees, with glabrous to densely velvety foliage. **Leaves** paired, shortly petiolate, often quite large, elliptic, oblong, or somewhat rounded; stipules broad, connate at base, apex with linear or subulate appendage, villous within. **Flowers** shortly petiolate; many together in axillary racemes or cymes; bracteate. **Calyx** glabrous, or hairy, often persistent, 5-lobed; lobes ovate, longer than tube; tube saucer-shaped. **Corolla** 5-lobed, yellow or greenish yellow, glabrous or hairy; lobes narrowly triangular, mostly reflexed; tube cylindric or campanulate, villous in throat, with a ring of deflexed hairs inside. **Stamens** 5, arising in corolla mouth; shortly exserted; filaments linear, shorter than anthers; anthers oblong or ovate, often apiculate. **Ovary** 5-locular, with a single pendulous ovule in each locule; style terete, sometimes swollen at base, shortly exserted; stigma thickened, cylindric, furrowed, minutely to distinctly 5-lobed at apex. **Fruit** large, indehiscent, ± globose, often lobed or angular in dry state, usually 5-locular with 5 pyrenes, sometimes with persistent calyx, often edible. $x = 11$ (aneuploids, polyploidy).

Species 27, tropical Africa and Madagascar; 5 in sthn Afr., widespread but absent from Western Cape.

Vangueriopsis Robyns 8351050

(Antirheoideae—Vanguerieae)

Robyns: 248 (1928); Launert: 27 (1966); Verdcourt & Bridson: 773 (1991); Bridson: 304 (1998).

Scandent shrubs or small trees, with or without spines, usually with stiff, thick branches. **Leaves** petiolate, oblong, elliptic or ovate, glabrous or hairy; stipules thick, triangular, connate at base into a sheath, long-caudate at apex. **Flowers** in opposite, simple to much-branched, many-flowered, axillary cymes; bracts conspicuous; buds elongate-lanceolate, beaked. **Calyx** 5-partite, segments erect, ovate to linear. **Corolla** 5-lobed, green, densely villous; lobes reflexed, long, linear; tube cylindric to somewhat campanulate, with ring of deflexed hairs within, rarely glabrous; throat glabrous. **Stamens** 5, arising in corolla mouth, exserted; filaments usually shorter than linear anthers. **Disc** annular, tumid. **Ovary** 2-locular, with a single pendulous ovule in each locule; style much exserted; stigmatic knob widely cylindric, 2-lobed. **Fruit** a subglobose drupe with 1 or 2 pyrenes. $x = 11$ (polyploidy).

Species 18, tropical Africa; 1 in sthn Afr.: *Vangueriopsis lanciflora* (Hiern) Robyns ex Good, Namibia.

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Rutaceae

(Rosidae—Sapindales)

Compiled by J.E. Victor

Trees, shrubs, or shrublets, rarely herbs, usually aromatic, sometimes monoecious or dioecious. **Leaves** alternate or opposite, simple, digitately 1–5-foliolate, or pinnate, gland-dotted; stipules 0. **Flowers** bisexual or unisexual, regular, in terminal or axillary umbels, heads, spikes, racemes, panicles, or occasionally solitary. **Sepals** (2–)5, free or sometimes ± connate. **Petals** 4 or 5, free, rarely 0 (*Empleurum*), hypogynous or perigynous, imbricate or rarely valvate. **Stamens** equalling number of petals or twice as many, rarely fewer or many, free or occasionally connate at base or adnate to petals, arising at base or rarely on margin of disc; anthers 2-thecous, usually with apical gland; staminodes present or 0. **Disc** between ovary and stamens, rarely absent. **Gynoecium** of 1–5, but most commonly 5 ± united carpels, each with (1)2(several) axile ovules; style simple; stigma variously capitate, discoid or ± deeply lobed. **Fruit** variable, mostly schizocarps, drupes or berries. **Seeds** often black, sometimes with arillus; embryo large, straight or bent; endosperm present and fleshy or absent.

Genera ± 160, species ± 1650, cosmopolitan in warm and temperate regions, mostly Africa and Australia; sthn Afr.: genera 22, species 290. 1 species: **Ruta graveolens* L. (4012000) is an occasional garden escape.

Sonder: 371 (1860); Mendonça: 181 (1963); Schreiber: 3 (1973).

Key to genera

1a Leaves simple; mainly shrubs and undershrubs, unarmed, often aromatic, often ericoid; rarely trees (*Calodendrum*):
2a Flowers bisexual:
3a Sepals and petals 4; stamens (4)8 ..... **Thamnosma**
3b Sepals and petals 5; stamens 5, sometimes staminodes present:
4a Tree with large flowers in open panicles; leaves comparatively large ..... **Calodendrum**
4b Shrubs, often ericoid and aromatic:
5a Style ± as long as petals, exceeding claw (if present); flowers terminal, in clusters and/or axils of leaves:
6a Staminodes present in a variety of shapes ..... **Agathosma**
6b Staminodes absent or vestigial:
7a Ovary with 3 (rarely 2 or 4) carpels ..... **Macrostylis**
7b Ovary with 5 carpels ..... **Phyllosma**
5b Style much shorter than petals, not exceeding claw (if present); flowers solitary, or few, or terminal, in reduced racemes, never in dense heads or clusters:
8a Petals transversely bearded at the throat ..... **Euchaetis**
8b Petals pubescent or glabrous at the throat:
9a Staminodes situated in groove in petal, connate below (except in *Coleonema nubigenum*) ..... **Coleonema**
9b Staminodes free from petals, or absent:
10a Anthers with stipitate apical gland ..... **Adenandra**
10b Anthers with sessile or immersed apical gland:
11a Anthers and ovary hairy ..... **Sheilanthera**
11b Anthers glabrous and ovary glabrous or with a few spiky hairs or with stalked glands:
12a Disc spreading-crenulate; staminodes absent or vestigial ..... **Diosma**
12b Disc obvallate; staminodes of simple shapes present ..... **Acmadenia**
2b Flowers unisexual; plants polygamous or dioecious:
13a Petals 0 ..... **Empleurum**
13b Petals 4 or 5 ..... **Teclea**
1b Leaves compound, pinnate or (1)3–5-foliolate; mainly trees or large shrubs:
14a Shrubs or undershrubs, ericoid, aromatic; stamens 8 ..... **Thamnosma**

14b Trees or large shrubs; stamens 4, 5, 8 or 10:
15a Leaves (1)3(5)-foliolate:
16a Carpels (2)4, united at base only, but sometimes cohering above ..... **Oricia**
16b Carpels 1–7, united for full length:
17a Scrambling shrubs, armed with prickles; flowers 5-merous; fruit 5–7-seeded ..... **Toddalia**
17b Trees or shrubs, unarmed; flowers 4(5)-merous; fruit 1–4-seeded:
18a Stamens (6 or 7)8; ovary 2–4-locular:
19a Ovary smooth; style short; stigma peltate ..... **Vepris**
19b Ovary verrucose; style 0; stigma 4-lobed ..... **Toddaliopsis**
18b Stamens 4 or 5; ovary 1-locular; style short; stigma peltate ..... **Teclea**
15b Leaves pinnate:
20a Flowers unisexual; stamens 4; fruit a globose capsule; shrubs or trees, armed with spines ..... **Zanthoxylum**
20b Flowers bisexual; stamens 8 or 10; fruit baccate; shrubs or trees, armed or unarmed:
21a Branches unarmed; leaf rachis not winged ..... **Clausena**
21b Branches armed with straight, axillary spines; leaf rachis winged ..... **Citropsis**

Acmadenia Bartl. & H.L.Wendl. 4040000

Bartling & Wendland: 59 (1824); Williams: 169 (1982a).

Ericoid shrubs or shrublets, usually single-stemmed at base. **Leaves** opposite or alternate, simple, linear to orbicular, obtuse or acute, sessile or shortly petiolate, often complicate when dry, erect, often imbricate, adpressed or spreading, gland-dotted, margins glandular-denticulate, ciliate or eciliate, midrib prominent. **Flowers** solitary or occasionally 2- or 3-nate or in terminal clusters 4–25 mm in diameter, terminal; bracts 1(2), leaf-like or reduced; bracteoles 2, much reduced. **Calyx** deeply divided; lobes 5, persistent. **Petals** 5, in most cases clawed, often bearded and bent inward at the throat, pink or white. **Stamens** 5; filaments short, acicular, normally glabrous; anthers 5, 2-locular, dorsifixed, not protruding; apical gland immersed, semi-immersed, globose or pointed, or large and conical; staminodes 5, vestigial or short, normally glabrous, glandular or pointed at the apex, not protruding. **Disc** cupular, exceeding the ovary, often equalling the stigma at first. **Ovary** (2–4)5-carpellate, ± 1 mm in diameter; apices globose, sometimes bifid or sometimes retuse with an immersed gland; stigma capitate; style short, glabrous, usually erect, sometimes deflexed. **Fruit** normally 5-carpellate, either exposed or hidden beneath persistent calyx lobes, usually with horns very short; seeds black, usually shining, with white or partly black arillus.

Species 33, mainly in Western Cape, extending eastwards into Eastern Cape.

Adenandra Willd. 4038000

Willdenow: 256 (1809); Strid: 1 (1972).

Subshrubs, rarely shrubs. **Leaves** alternate, rarely opposite, simple, elliptic, lanceolate or linear, entire, sometimes ciliate or pectinate, often with 2 glands at base of petiole. **Flowers** terminal, solitary or in subumbellate racemes, sometimes glutinous. **Calyx** 5-partite. **Petals** 5, sessile or with short, glabrous claws. **Disc** cupular, 5–10-lobed. **Stamens** 5, shorter than calyx, inserted on outer margin of disc; anthers with a stalked, spoon-shaped, rarely globose gland at apex; staminodes 5, each with a terminal gland. **Ovary** 5-lobed, 5-locular, with 2 ovules in each locule, covered with stalked glands; style simple, usually terete; stigma discoid, 5-lobed. **Fruit** breaking up into separate cocci, obtuse or horned, glandular-muricate. $x = 7$ (aneuploids, polyploidy).

Species 18, endemic to Western Cape.

Agathosma Willd. 4037000

Willdenow: 259 (1809) name conserved; Pillans: 55 (1950).

Barosma Willd.: 259 (1809).

Shrubs or undershrubs. **Leaves** opposite, ternate, quaternate, alternate, or scattered, simple, entire or glandular-crenate, shortly petiolate, variable in shape, usually ± conspicuously gland-dotted beneath. **Flowers** bisexual or gynoecium imperfect, pedunculate or occasionally sessile, mostly in terminal clusters, often solitary or few together in axils of upper leaves; bracteoles 2 or 0. **Calyx** 5-parted, often with sepals unequal. **Petals** 5(–8), hypogynous, imbricate, sometimes clawed, usually gland-dotted on lower surface. **Stamens** 5, free at base of disc; filaments terete or compressed; anthers introrse, with terminal gland on connective; staminodes opposite, but rarely adnate to petals, often petaloid, usually with gland behind apex. **Disc** cup-shaped, crenulate, rarely toothed or lobed, clasping or enveloping ovary. **Ovary** superior, of 1–5 almost free carpels, usually with process near apex of dorsal angle and with 2 superimposed or collateral, axile ovules; style elongate, with simple or subcapitate stigma. **Fruit** capsular, with 1–5 1-seeded cocci, the inner and outer walls separating at maturity. $x = 13$ (1 report).

Species 140, sthn Afr., concentrated in Western Cape, extending into Eastern Cape, 1 species: *Agathosma ovata* (Thunb.) Pillans, extending into KwaZulu-Natal and Lesotho.

Calodendrum Thunb. 4035000

Thunberg: 41 (1782) name conserved.

Calodendron Sond.: 371 (1860).

Tree, evergreen or deciduous. **Leaves** opposite, simple, petiolate, large, gland-dotted. **Flowers** in large, terminal, paniculate racemes. **Sepals** 5, somewhat fleshy, valvate, spreading when mature. **Petals** 5, spreading or reflexed, linear, imbricate. **Disc** cupular. **Stamens**: usually 5 fertile and equalling petals, and 5 petaloid staminodes with immersed glands; filaments terete; anthers oblong, with immersed apical gland. **Ovary** stalked, 5-lobed, 5-locular, ovoid, tuberculate,with stipitate glands at apex, with 2 ovules in each locule; style much longer than ovary, glandular; stigma subcapitate. **Fruit** a woody, 5-angled capsule covered with blunt protuberances; seeds large, black, shiny, containing oil. $x = 9$ (1 report, polyploidy).

Species 1, tropical and sthn Afr., Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape; in forests.

Citropsis (Engl.) Swingle & M.Kellerm. 4092010

Swingle & Kellerman: 419 (1914); Mendonça: 193 (1963).

Trees or shrubs, with axillary spines. **Leaves** alternate, imparipinnate, (1–3)5- or 6-foliolate, with petiole and rachis winged; leaflets gland-dotted, with slightly crenate margin. **Flowers** in short, axillary racemes. **Calyx**

(4)5-lobed, cupuliform. **Petals** (4)5. **Stamens** 8(10). **Disc** annular. **Ovary** 4(5)-locular with 1 ovule in each locule; style elongate; stigma subglobose, 4(5)-lobed. **Fruit** baccate, globose, punctate with oil glands. $x = 9$.

Species ± 4, Africa; 1 in sthn Afr.: *Citropsis daweana* Swingle & M.Kellerm., Okavango and Caprivi (Namibia).

Clausena Burm.f. 4091000

Burman: 243 (1768); Mendonça: 191 (1963); Molina: 105 (1994).

Trees or shrubs. **Leaves** alternate, imparipinnate, densely gland-dotted. **Flowers** in axillary, cymose panicles. **Sepals** 4 or 5, small, united at base. **Petals** 4 or 5, imbricate, membranous. **Stamens** 8 or 10, inserted at base of disc; anthers elliptic, dorsifixed, introrse, without apical gland. **Ovary** (2 or 3)4- or 5-locular, with 2 ovules in each locule; style short, caducous; stigma broad, obtuse, or 2–5-lobed. **Fruit** baccate, 1- or 2-seeded. $x = 9$ (polyploidy).

Species ± 50, Africa to Malaysian region; 1 in sthn Afr.: *Clausena anisata* (Willd.) Hook.f. & Benth., Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Western and Eastern Cape.

Coleonema Bartl. & H.L.Wendl. 4039000

Bartling & Wendland: 55 (1824); Williams: 63 (1981a).

Shrubs or shrublets, virgate, erect, arising (except for *C. nubigenum*) from a single stem at base. **Leaves** alternate, linear or linear-lanceolate, acute, mucronate, petiolate, glabrous, gland-dotted, ± in two rows; margins narrowly translucent, smooth, ciliolate, serrulate or villose-ciliate. **Flowers** solitary, terminal or axillary, subtended by 3–8 bracts and 2 bracteoles. **Petals** 5, spreading, white or pink; claw (except for *C. nubigenum*) connate with staminode. **Anthers** 5, each with a minute apical gland. **Disc** cupular, narrow, partly free, fairly level on top. **Ovary** 5-carpellate, glabrous; apices globose with an immersed gland; stigma capitate, depressed globose; style and filaments short, glabrous. **Fruit** 5-carpellate, glabrous, hornless or with short horns, spreading or erect. $x = 17$ (9) (polyploidy).

Species 8, concentrated in Western Cape, extending eastwards to Uitenhage (S Eastern Cape).

Diosma L. 4041000

Linnaeus: 198 (1753); Williams: 329 (1982b).

Shrubs or shrublets, low and spreading or erect, normally arising from a single stem at base. **Leaves** alternate or opposite, simple, sessile or shortly petiolate, gland-dotted, glabrous or pubescent. **Flowers** terminal, up to 10 mm in diameter, usually much less, shortly pedicellate or sessile, solitary or up to 4-nate or crowded up to 12 together, borne on short branchlets or in much reduced compound racemes; bract 1 per flower; bracteoles 2, usually very much reduced. **Calyx** lobes 5, small, persisting, usually minutely ciliolate below with translucent margins. **Petals** 5, white or cream or slightly reddened, orbicular, oblong, elliptic, ovate or broadly lanceolate, sessile or sometimes subsessile, connate with lobes of disc, usually spreading. **Stamens** 5; filaments 1–2 mm long, acicular, glabrous rarely with a few minute hairs; anthers 5, bilocular, splitting lengthwise, dorsifixed; apical gland sessile, or rarely apex tapering to a recurved gland or gland inflexed; staminodes 0 or seen as a vestigial gland on outer edge of lobes of disc. **Disc** well developed, sinuate-crenulate, 5-lobed, fleshy, nectariferous, standing open, much longer than ovary; stigma capitellate; style 0.5–2 mm long, usually at some stage deflexed. **Ovary** 5-carpellate, often glandular with the gland persisting and immersed at apex of horn of ripe fruit. **Fruit** 5-carpellate; carpels glabrous or rarely puberulous, striate-veined, pilose with gland dots or rarely with warty swellings; horns erect or spreading, long or short. $x = 10$ or 15 (polyploidy).

Species 28, concentrated in Western Cape and extending eastwards to near Grahamstown (Eastern Cape).

Empleurum Aiton 4046000

Aiton: 340 (1789); Williams: 425 (1984).

Shrub erect, polygamous. **Leaves** alternate, simple. **Flowers** unisexual or bisexual, small, axillary, 1–3 together, bracteolate. **Calyx** subcampanulate, with thickish lobes. **Petals** 0. **Disc** 0 or inconspicuous in female flowers. **Male flowers**: stamens 4, opposite calyx lobes; anthers longer than filaments, oblong, with 2 shoulders and gland between shoulders or linear-ovate, with apical gland. **Female flowers**: ovary sessile, 1-locular, with glandular appendage larger than ovary, 2-ovulate; style lateral, thick, linear-ovate, nearly as long as ovary; stigma simple. **Fruit** narrowly ovate.

Species 2, sthn Afr., from Western Cape to Uitenhage in Eastern Cape.

Euchaetis Bartl. & H.L.Wendl. 4043000

Bartling & Wendland: 15 (1824); Williams: 157 (1981b).

Shrubs or shrublets, erect, and usually single-stemmed at base. **Leaves** alternate or opposite, linear, linear-lanceolate, to orbicular, flat, round-backed, subcomplicate, or subulate; erect or spreading. **Flowers** terminal, solitary or 2-nate or aggregated into heads of up to 60 florets, flowering at different times and mostly without any conspicuous involucral leaves; flowers subtended by 1, or rarely 2, bracts and 2 bracteoles. **Petals** 5, distinctly divided into claw and limb; claw transversely bearded above, ciliate on margins and narrowing below, forming a cage around reproductive parts of flower; limb white or pale pink, usually spreading. **Stamens** 5; filaments usually ± 1 mm long, glabrous, acicular; anthers dorsifixed, apical gland globose, minute; staminodes 5, rarely 0, usually a minute vestigial sessile gland. **Disc** enveloping, obvallate or spreading, exceeding ovary. **Ovary** 5-carpellate; apices globose; stigma capitellate or capitate-globose; style becoming 0.5–1.6 mm long, glabrous, erect, or, at some stage, deflexed. **Fruit** (3)5-carpellate; horns (0.5–)1–2(–7) mm long. $x = 7$ or 14 (polyploidy).

Species 23, sthn Afr., concentrated in the Western Cape.

Macrostylis Bartl. & H.L.Wendl. 4044000

Bartling & Wendland: 191 (1824); Williams: 373 (1981c).

Shrubs or shrublets, often forming dense bushes, either arising from a single stem at base or with several stems coppicing after fires; branchlets short, slender, often puberulous. **Leaves** usually alternate, subulate, lanceolate, ovate, elliptic, or cordate, adpressed or spreading, ciliate, ciliolate or eciliate, sessile, or (in *M. villosa*) with short petiole. **Flowers** very small, terminal, (1–)5–8(–14)-aggregate, or in *M. barbigera* pedunculate; flowers subtended by 1 bract and 2 bracteoles, usually sessile. **Calyx** 5-lobed, persisting if fertile. **Petals** 5, crisp-bearded about middle, sometimes sparsely ciliate towards the middle at the sides, white or cream-white; staminodes 5, vestigial (in *M. cassiopoides* 0.7 mm long). **Stamens** 5; filaments becoming 3–9 mm long, carrying spent anthers beyond petals, glabrous; anthers dorsifixed; apical gland globose, minute, usually sessile. **Disc** enveloping the ovary, nectariferous. **Ovary** (2)3(4)-carpellate, glabrous; stigma simple or capitellate; style

becoming 3.5–9 mm long, usually exceeding the petals by a long way, glabrous, filiform. **Fruit** normally 3-carpellate with only 1 or 2 developing; horns (1.5–)3–5 mm long; seeds with white aril adjacent to truncated apex.

Species 10, sthn Afr., concentrated in Western Cape, extending northwards to Clanwilliam and eastwards to Uitenhage (Eastern Cape).

Oricia Pierre 4070000

Pierre: 1288 (1897); Mendonça: 195 (1963); Verdoorn:411 (1926).

Trees. **Leaves** alternate or opposite, 3–5-foliolate, usually large; leaflets narrowly ovate. **Flowers** unisexual, with occasional bisexual ones on flattened, tomentose pedicels in axillary and terminal racemes or panicles. **Calyx** shortly 4-lobed, saucer-shaped. **Petals** 4, ovate, obtuse. **Male flowers**: stamens 4, without apical gland; ovary rudimentary. **Female flowers**: stamens rudimentary; ovary of 2–4 carpels, variously free or cohering, with 2 pendulous ovules in each locule, hispid; style short, terete; stigma peltate. **Fruit** drupaceous, of 2–4 distinct carpels, 1–3 carpels aborted; seeds solitary in locules.

Species 8, Africa; 3 in sthn Afr., Northern Province and Mpumalanga to Eastern Cape.

Phyllosma Bolus ex Schltr. 4042000

Schlechter: 457 (1898); Williams: 755 (1981d).

Shrublet. **Leaves** scattered or upper ones subopposite, simple, linear, with thickened, revolute margin. **Flowers** shortly pedicellate, terminal, solitary or often fascicled, bibracteate. **Calyx** 5-partite; segments lanceolate, keeled, ciliate. **Petals** 5, with an elliptic limb and long, pilose claw. **Disc** saucer-shaped, with 5 short, bifid lobes. **Stamens** inserted on outer margin of disc; filaments subterete, pilose, lengthening greatly; anthers broadly elliptic, with sessile, apical gland; pollen oblong or ellipsoid; staminodes 0. **Disc** closing over ovary at first. **Ovary** 5-lobed, 5-locular, with 2 ovules in each locule, shortly villous above; style simple, lengthening greatly (± as long as stamens), pilose; stigma small, simple. **Fruit** 5-carpellate; horns 3–5 mm long.

Species 2, sthn Afr., Western Cape: Ceres, Clanwilliam and Worcester Districts.

Sheilanthera I.Williams 4042010

Williams: 761 (1981d).

Dwarf shrubs, dense, rounded, spreading, single-stemmed at base. **Leaves** alternate, elliptic-oblong, obtuse, spreading, margins revolute, thick, with large immersed gland dots adjacent to small glandular tumuli; adaxial surface convex, glabrous, with a shallow median groove; abaxial surface densely pubescent in two grooves adjacent to the conspicuous gland-dotted midrib; new leaves normally villous with stipitate glands having reddish resinous tips. **Flowers** terminal, 1–3-nate, 9 mm in diameter; bract lanceolate; apex subacute with several stipitate glands; bracteoles 2, lanceolate; apex acute with a stipitate gland. **Calyx** lobes 5, pubescent with scattered stipitate glands. **Petals** 5, limb fan-shaped, thinly villous below, spreading; claw linear, erect, pink fading to white. **Stamens** 5, filaments becoming 2 mm long, erect, glabrous, acicular; anthers thinly pubescent, apical gland sessile; staminodes 0. **Disc** obvallate, much higher than ovary, sinuate, level, exuding nectar. **Ovary** 5-carpellate, densely pubescent, each lobe with a globose apical gland; stigma 5-lobed, capitellate; style glabrous, erect. **Fruit** 5-carpellate; horns 1–2 mm long.

Species 1: *Sheilanthera pubens* I.Williams, confined to the Cold Bokkeveld near Ceres (Western Cape).

Teclea Delile 4085000

Delile: 90 (1843); Verdoorn: 401 (1926); Mendonça: 205 (1963).

Trees or shrubs, dioecious. **Leaves** alternate, (1)3-foliolate, gland-dotted; petiole sometimes winged. **Flowers** unisexual in axillary and terminal panicles, racemes, cymes, or spikes. **Calyx** usually shortly 4- or 5-lobed, cup-shaped. **Petals** 4 or 5. **Male flowers**: stamens as many as petals, inserted at base of disc, anthers dorsifixed, cordate, without apical gland; ovary rudimentary. **Female flowers**: staminodes as many as petals; disc sometimes present; ovary sessile, globose, 1-locular, with 2 pendulous ovules; style short or cylindric; stigma peltate. **Fruit** drupaceous, 1-seeded. $x = 9$ (1 report, polyploidy).

Species ± 22, Africa and Mascarene Islands; 4 in sthn Afr., Mpumalanga, Swaziland and eastern coastal region.

Thamnosma Torr. & Frém. 4014000

Torrey & Frémont: 313 (1845); Mendonça: 183 (1963); Schreiber: 3 (1973).

Undershrubs or shrubs, leafy or nearly leafless, with immersed glands. **Leaves** alternate, (3)5-foliolate; leaflets linear or cuneate, entire or rarely slightly lobed at apex. **Flowers** pedicelled, in small, terminal racemes. **Calyx** of 4 small sepals or 4-lobed. **Petals** 4, sessile, suborbicular, entire, imbricate. **Disc** cupular, crenate or lobed. **Stamens** 8, inserted at base of disc. **Ovary** sessile or stalked, 2-lobed, 2-locular, with several ovules in each locule, with immersed glands; style simple; stigma capitate. **Fruit** a 2-lobed capsule, with 4–6 seeds. $x = 9$ (10) (1 report each).

Species ± 6, southwestern and North America, Sokotra; 2 in sthn Afr., Namibia, Botswana, Northern Province, Mpumalanga, Northern Cape.

Toddalia Juss. 4077000

Jussieu: 371 (1789); Verdoorn: 400 (1926); Mendonça: 197 (1963).

Scrambler, woody, dioecious; branches usually with recurved prickles. **Leaves** alternate, 3-foliolate; leaflets narrowly lanceolate to obovate, slightly crenulate on margin, gland-dotted. **Flowers** unisexual, in axillary and terminal panicles, pubescent. **Calyx** 5-dentate or -lobed, cup-shaped. **Petals** 5, free, imbricate, somewhat fleshy. **Male flowers**: stamens 5; anthers sagittate, without apical gland; ovary rudimentary. **Female flowers**: staminodes small; ovary sessile, 5–7-locular, with 2 ovules in each locule; style 5- or 6-lobed. **Fruit** drupaceous, ± pea-sized, 5–7-locular, with 1 or 2 locules aborted. $x = 9$ (high polyploidy).

Species 1: *Toddalia asiatica* (L.) Lam., extending from tropical Africa into Northern Province.

Toddaliopsis Engl. 4078000

Engler: 433 (1895); Verdoorn: 400 (1926); Mendonça: 205 (1963).

Shrubs or small trees, dioecious. **Leaves** alternate, 3-foliolate; leaflets ± narrowly ovate-elliptic, densely pellucid-dotted. **Flowers** unisexual, in small, terminal and axillary panicles or racemes. **Sepals** 4, free almost to base. **Petals** 4. **Male flowers**: stamens 8; anthers cordate, without apical gland; ovary conspicuous but aborted. **Female flowers**: disc prominently lobed; staminodes 8; ovary slightly 4-lobed, with thick, verrucose walls, 4-locular with 2 ovules in each locule; stigma sessile, 4-lobed. **Fruit** woody, globose, warty, 1–3 carpels aborted; seeds solitary in locules.

Species 2, Africa; 1 in sthn Afr.: *Toddaliopsis bremekampii* I.Verd., Northern Province, Mpumalanga, Swaziland and N KwaZulu-Natal.

Vepris Comm. ex A.Juss. 4076000

Jussieu: 509 (1825); Verdoorn: 394 (1926); Mendonça: 199 (1963).

Trees or shrubs, dioecious. **Leaves** alternate, rarely opposite, digitately 1 or 3(2 or 4)-foliolate, gland-dotted; leaflets usually narrowly ovate, sometimes with crinkled margins. **Flowers** unisexual, in axillary or terminal cymes, panicles, or racemes. **Calyx** cup- or saucer-shaped, shortly (3)4-lobed. **Petals** (3)4, somewhat fleshy. **Male flowers**: stamens 8, without apical gland; ovary rudimentary, 2–4-angled and with 2–4 styles. **Female flowers**: staminodes 8, rudimentary; ovary 2–4-locular, with 2 ovules in each locule; style short; stigma peltate. **Fruit** 2–4-locular, 1–3 locules aborted; seeds solitary in locules.

Species ± 15, mostly Africa to Mascarene Islands and India; 5 in sthn Afr., Northern Province, Mpumalanga and southeastern coastal region of Eastern Cape, 1 extending into Western Cape.

Zanthoxylum L. 3991000

Linnaeus: 270 (1753).

Fagara L.: 897 (1759); Mendonça: 183 (1963). *Xanthoxylon*, *Zanthoxylon* and *Xanthoxylum* are incorrect spellings.

Shrubs or trees, monoecious or dioecious, spinescent; stems and thick branches usually with knobs. **Leaves** alternate, pinnate; leaflets 3–9-jugate, with immersed glands. **Flowers** unisexual, in panicles. **Calyx** of 4 small, ciliate sepals. **Petals** 4, free. **Male flowers**: stamens 4, opposite sepals; ovary rudimentary. **Female flowers**: staminodes rudimentary or 0; ovary obliquely obovate, with the 2 sutures distinct, unilocular, with 2 apical ovules, with immersed glands; style simple, shorter than ovary and obliquely inserted; stigma capitate. **Fruit** a globose capsule. $x = 17$ (10, 11, 16, 18) (high polyploidy, B-chromosomes).

Species ± 250, Africa to East Indies and America; 6 in sthn Afr., widely distributed.

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Salicaceae

(Dilleniidae—Violales)

Compiled by M. Jordaan

Deciduous trees or shrubs, sometimes creeping and spreading by suckering, with bitter bark and soft light wood; plants dioecious. **Leaves** alternate, entire, toothed or occasionally lobed; stipules foliaceous and subpersistent, or small and caducous. **Inflorescences** erect or pendulous spikes or catkins; bracts membranous, entire, toothed or laciniate, fugacious or persistent, subtending individual flowers, often appearing before leaves. **Perianth** absent or represented by a cup-shaped or annular disc or 2 scales or glands at the base. **Male flowers** with 2–many stamens; filaments free or ± connate; anthers small, ovate or oblong, opening by 2 longitudinal slits; ovary rudimentary or absent. **Female flowers** with ovary superior, sessile or shortly stalked, 1-locular; ovules 2–many on each parietal or basal placenta, anatropous, crassinucellar, unitegmic; style short; stigmas 2–4, short, thick, emarginate or 2-fid. **Fruit** a capsule, ovoid or oblong in outline, often acuminate, dehiscing by 2–4 valves. **Seeds** many, very small, with large basal tuft of long hairs arising from funicle, not long-lived, distributed by wind; embryo small, straight; endosperm absent or very scanty and oily.

Genera 2; species ± 550, chiefly of moist or wet habitats, mainly in the cooler parts of the northern temperate and subarctic zones, scarce and chiefly in highland areas in the tropics; absent from Australasia and New Guinea; sthn Afr.: genera 2 (1 exotic), species ± 6 (including exotics).

Mirbel: 905 (1815); Lindley: 186 (1836); Andersson: 190 (1868); Bentham: 411 (1880) as Salicineae; Pax: 29 (1888); Fisher: 307 (1928); Wilmot-Dear: 120 (1991).

Key to genera

Terminal buds present, rarely lacking; winter buds with several clearly visible unequal outer scales; mature leaves relatively broad; catkins pendulous; floral bracts apically serrate or laciniate; male disc cup-shaped or annular; cultivated and naturalised plants ..... ***Populus**

Terminal buds lacking; winter buds with 1 outer scale; mature leaves narrow; catkins usually upright; floral bracts entire; male disc of 1 or 2 small distinct glands at base; indigenous, naturalised and cultivated plants ..... **Salix**

*Populus L. 1872000

Linnaeus: 1034 (1753); Linnaeus: 456 (1754); Adanson: 376 (1763); Jussieu: 409 (1789); Willdenow: 802 (1806); Andersson: 323 (1868); Bentham: 412 (1880); Pax: 35 (1888); Adamson: 311 (1950); Bailey & Bailey: 900 (1976); Wilmot-Dear: 121 (1991).

Trees with furrowed, pale bark and terete or angled branches with terminal buds; winter buds resinous, with several unequal outer scales. **Leaves** alternate, mostly broadly ovate to rhombic, long-stalked, entire or dentate; stipules membranous, small, narrow. **Inflorescences** pendulous, odourless catkins, appearing before leaves. **Flowers** unisexual, anemophilous; borne in axil of a serrate or laciniate bract; perianth reduced to a cup-like disc. **Male flowers** with 4–30 or more stamens; filaments free; anthers 2-thecous, oblong to ovate, red. **Female flowers** with ovary sessile or subsessile, 1-locular; ovules many; style very short, 2–4-branched, each branch entire or 2- or 3-fid. **Capsule** 2–4-valved. **Seeds** many, brown, small and ovoid or obovoid, with a tuft of long silky hairs arising from the funicle. $x = 19$ (aneuploids, polyploidy).

Species ± 40, confined to northern temperate and subtropical regions apart from the single East African species *Populus ilicifolia* (Engl.) Rouleau; in sthn Afr. a few species have been widely cultivated, e.g. *P. deltoides* Bartram ex Marshall (Match Poplar) principally for wood pulp, matches and boxes; 2 species have escaped and become naturalised, especially in marshy areas and in river valleys: **P. alba* L. (White Poplar) and **P.* × *canescens* (Aiton) Sm. (Grey Poplar), where they spread by suckering; the latter is now a widespread invader of watercourses in the Western Cape (Henderson 1998).

Salix L. 1873000

Linnaeus: 1015 (1753); Linnaeus: 456 (1754); Adanson: 376 (1763); Jussieu: 408 (1789); Willdenow: 655 (1806); Thunberg: 30 (1823); Andersson: 1 (1867); Andersson: 190 (1868); Bentham: 411 (1880); Pax: 36 (1888); Burtt Davy: 62 (1922); Skan: 575 (1925); Burtt Davy: 431 (1932); Adamson: 310 (1950); Friedrich-Holzhammer: 1 (1967); Immelman: 171 (1987); Wilmot-Dear: 120 (1991).

Deciduous trees or shrubs with usually terete branches lacking terminal buds; winter buds each protected by a single outer scale, buds sometimes glutinous; branches ± flexible. **Leaves** alternate, petiolate or sessile, oblong, lanceolate or linear, entire or serrulate; stipules various. **Inflorescences** small, dense, usually erect, firm catkins, appearing before or with the leaves. **Flowers** unisexual, entomophilous; borne in axil of an entire bract, with 1 or 2 small nectariferous glands at base. **Male flowers** with 2 stamens or, in a few species, 3–many; filaments slender, free or sometimes connate, exceeding the scale. **Female flowers** of a single ovary, composed of 2 carpels, sessile or stipitate; ovules often 4–8, arranged on 2 placentas; style often short, with 2 short, retuse or bifid stigmas. **Capsule** many-seeded, dehiscing by 2 recurving valves. **Seeds** many, long, enveloped in silky wool. $x = 19$ (aneuploids, polyploidy, B-chromosomes).

Species ± 400, mostly in temperate parts of the northern hemisphere; 1 indigenous species with 5 subspecies in sthn Afr., widespread along rivers; 4 exotic species have become naturalised of which one: **Salix babylonica* L., the Weeping Willow, occurs widely along rivers and streams.

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Salvadoraceae

(Dilleniidae—Capparidales)

Compiled by J.E. Victor

Shrubs or trees, sometimes subscandent, unarmed or with axillary spines; dioecious or polygamous; usually containing mustard oils. **Leaves** opposite, simple, entire; stipules rudimentary or 0. **Inflorescence** terminal and axillary, simple or paniculate. **Flowers** regular, bisexual to unisexual. **Calyx** campanulate, 4-lobed. **Corolla** free or united; tube shorter than calyx; segments or lobes 4, imbricate. **Stamens** 4, arising at base of corolla and united in a ring or on the tube, alternating with the lobes; anthers 2-locular, dehiscing longitudinally. **Disc** 0, annular, or of separate glands be-

tween filaments at base of corolla. **Ovary** superior, 1- or 2(3)-locular; style short to almost absent; stigma terminal; ovules 1 or 2 in each locule, basal, erect. **Fruit** small, a drupe or berry. **Seed** exalbuminous, with thick cotyledons.

Genera 3, species ± 10, Africa, Mascarenes, Arabian Peninsula and Asia; sthn Afr.: genera 2, species 3.

Verdoorn: 128 (1963); Vickery: 375 (1983).

Key to genera

Shrub with axillary spines, dioecious; ovary 2-locular ..... **Azima**
Trees or shrubs, unarmed; flowers bisexual or occasionally one sex retarded; ovary 1-locular ..... **Salvadora**

Azima Lam. 6444000

Lamarck: 343 (1783); Verdoorn: 129 (1963); Friedrich-Holzhammer: 1 (1968); Vickery: 375 (1983).

Monetia L'Hér.: t. 1 (1785).

Shrubs, erect or scrambling, spinous. **Leaves** rather coriaceous, opposite and decussate. **Spines** straight, usually 2 in axil of each leaf. **Inflorescence** axillary, with clustered and sessile flowers (then usually female) or in short spikes which are sometimes branched at base, paniculate, with the sessile flowers in pairs at intervals on rachides (then usually male). **Calyx** campanulate, 4-lobed and slightly 2-lipped. **Petals** 4, arising at base of ovary, eventually longer than calyx and reflexing over it. **Male flower** with 4 stamens alternating with petals; anthers eventually exserted; rudimentary ovary on a small disc in centre of stamens. **Female flower** with 4 rudimentary, sterile stamens appressed to lower half of ovary; ovary eventually exserted from calyx, narrowing very slightly in upper half and crowned with subsessile stigma, (1)2(3)-locular, with 1 or 2 erect ovules in each locule. **Fruit** globose, usually 1-seeded. **Seeds** compressed, exalbuminous; cotyledons cordate; radicle straight. $x = 11$ (1 report).

Species 4, Africa, Madagascar, Asia; 1 in sthn Afr.: *Azima tetracantha* Lam., Namibia, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Salvadora L. 6446000

Linnaeus: 122 (1753); Verdoorn: 132 (1963); Vickery: 380 (1983).

Shrubs or trees, often bushy, sometimes subscandent; sometimes emitting an unpleasant odour. **Leaves** opposite, with minute oil glands. **Inflorescence** terminal and axillary in upper leaves; flowers bisexual or subunisexual, pedicelled to subsessile, in long, branched panicles which are sometimes sessile and so appearing to be in fascicled spikes. **Calyx** campanulate, 4-lobed up to about midway. **Corolla** shortly united at base; lobes 4, obtuse, eventually upper portion spreading or reflexing. **Stamens** arising on corolla tube, alternating with lobes; anthers slightly shorter than free portion of filament. **Disc** usually present, consisting of 4 squamae at base of corolla tube and alternating with stamens. **Ovary** 1-locular, with solitary, basal ovule; style short; stigma terminal, inconspicuous. **Fruit** a small drupe, exalbuminous. $x = 12$ (13).

Species 5, Africa, Arabian Peninsula and Asia; 2 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Mpumalanga and KwaZulu-Natal.

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Santalaceae

(Rosidae—Santalales)

Compiled by M. Jordaan & P. Burgoyne

Trees, shrubs, herbs, often hemiparasitic on roots of other plants. **Leaves** alternate or opposite, simple, entire, often glabrous, reduced to scales in parasites; stipules 0. **Inflorescences** axillary or terminal spikes, racemes or capitate. **Flowers** bisexual or unisexual, regular, epigynous, usually small, greenish or white. **Perianth** 1-whorled; tube short and cylindrical to slender, obconic; perianth lobes 3–5(6), valvate, glabrous, often fleshy, adnate to ovary, usually with a tuft of hairs inside at back of anthers. **Stamens** as many as perianth lobes, arising on perianth tube opposite to and below perianth lobes; filaments free, short, slender; anthers 2-thecous, dehiscing longitudinally. **Disc** epigynous or perigynous, prominent or obscure. **Ovary** inferior to half-inferior, of 3–5 fused carpels, 1-locular; ovules (1)2–5, but only 1 develops, pendulous from apex of a free-central placenta, anatropous, unitegmic; style short or cylindrical, simple; stigma terminal, capitate or 2–5-lobed. **Fruit** indehiscent, a nut or a drupe. **Seed** 1, globose or ovoid; without a testa; endosperm copious, fleshy, oily or starchy; embryo central, oblique.

Genera ± 36; species ± 500, in subtropical and temperate regions of both hemispheres; sthn Afr.: genera 5, species ± 200.

Brown: 350 (1810); Candolle: 619 (1857); Bentham: 217 (1880); Hieronymus: 202 (1889); Pilger: 52 (1935).

Key to genera

1a Fruit a nut; hemiparasitic herbs or subshrubs; leaves usually small to scale-like:
  2a Flowers unisexual, generally 4-merous ..... **Thesidium**
  2b Flowers bisexual, generally 5-merous ..... **Thesium**
1b Fruit a drupe; trees or shrubs, sometimes scandent; leaves usually well developed:
  3a Leaves opposite:

4a Flowers generally 5-merous; leaves subsessile with cordate base ..... **Rhoiacarpos**
4b Flowers generally 4-merous; leaves shortly petiolate with cuneate base ..... (= *Colpoon*) **Osyris**
3b Leaves alternate:
5a Flowers generally 3-merous, bisexual or male; fairly densely branched small trees or shrubs ..... **Osyris**
5b Flowers generally 5-merous, bisexual; weak, loosely branched shrubs ..... **Osyridicarpos**

Osyridicarpos A.DC. 2116000

Candolle: 635 (1857); Bentham: 222 (1880); Hieronymus: 223 (1889); Baker & Hill: 431 (1911); Hill: 206 (1915a); Hill: 100 (1915b); Pilger: 84 (1935); Stauffer: 400 (1961); Miller: 382 (1989).

Climbing shrubs with long, slender branches; stems scandent. **Leaves** alternate, shortly petiolate, oblong to lanceolate, 3-nerved. **Inflorescence** a terminal raceme, with small bracteoles. **Flowers** bisexual, small, green, subtended by 1 bract and 2 minute bracteoles. **Perianth**: tube cylindrical, adnate to ovary below; lobes 5, with tuft of hairs attached to back of anthers. **Stamens** 5; anthers ovoid. **Disc** obscure. **Ovary**: ovules 2 or 3, pendulous from apex of a flexuous, filiform, central placenta; style simple; stigma capitate. **Fruit** a drupe, crowned with persistent perianth lobes.

Monotypic, Africa, from Ethiopia to sthn Afr.: *Osyridicarpos schimperianus* (Hochst. ex Rich.) A.DC., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Osyris L. 2108000

Linnaeus: 1022 (1753); Linnaeus: 448 (1754); Candolle: 632 (1857); Bentham: 227 (1880); Hieronymus: 218 (1889); Baker & Hill: 433 (1911); Hill: 208 (1915a); Pilger: 76 (1935); Levyns: 332 (1950); Stauffer: 388 (1961); Roessler: 1 (1969); Miller: 382 (1989); Bean: 665 (1990); Hilliard: 391 (1994); Van Wyk & Van Wyk: 220, 352 (1997).

Colpoon P.J.Bergius: 38, t. 1, fig. 1 (1767); Bentham: 225 (1880); Hieronymus: 217 (1889); Hill: 209 (1915a); Pilger: 83 (1935); Stauffer: 390 (1961).

Small trees or shrubs, sometimes androdioecious. **Leaves** alternate, subopposite to opposite and decussate, shortly petiolate, penninerved, glabrous, blue-green with a grey bloom. **Inflorescences** lateral cymes, terminal panicles or flowers solitary; sometimes with leaf-like bracts at base. **Flowers** bisexual or male. **Perianth**: tube short, adnate to ovary, solid in male flowers; lobes 3 or 4(–6), deltoid, yellowish green, with a tuft of hairs arising on back of anthers. **Disc** ± flat, angled between stamens. **Stamens** 3 or 4, arising at base of perianth lobes, subtended by minute caducous bracts. **Ovary** fleshy; ovules 3 or 4; style simple; stigma 3- or 4-lobed. **Fruit** an ovoid or globose drupe, crowned with persistent perianth lobes, red purplish black, edible. **Seed** solitary; endosperm fleshy. $x = 10$ (polyploidy).

Species 9, throughout Africa, the Mediterranean area and S Asia; 3 in sthn Afr., all countries and provinces except Northern Cape.

Rhoiacarpos A.DC. 2104010

Candolle: 634 (1857); Hill: 207 (1915a); Hill: 100 (1915b); Pilger: 82 (1935); Stauffer: 388 (1961).

Straggling shrub, with 4-angled branches. **Leaves** opposite, stout, leathery, sessile, ± rounded or subcordate at base, with prominent midrib, margins slightly inrolled. **Inflorescences** short, axillary or terminal racemes or panicles of usually 3-flowered cymules, bracteate. **Flowers** bisexual, yellow. **Perianth**: tube short, slender, obconic; lobes 5, ovate, acute, persistent, with a tuft of hairs attached to anthers. **Stamens** 5; anthers ovoid. **Disc** subconcave, with short, prominent, obtuse lobes. **Ovary** fleshy; ovules 5, pendulous from straight cylindrical placenta; style cylindric-conical; stigma 5-lobed, minute, alternating with perianth lobes. **Fruit** an ovoid drupe, crowned with persistent perianth lobes, red, edible. **Seed** bony.

Monotypic: *Rhoiacarpos capensis* (Harv.) A.DC., Western Cape from about Mossel Bay to Eastern Cape and KwaZulu-Natal.

Thesidium Sond. 2117000

Sonder: 364 (1857); Hill: 201 (1915a); Levyns: 340 (1950).

Hemiparasitic, dioecious shrublets, or annual or perennial herbs. **Leaves** alternate, often scale-like. **Inflorescence** a slender, terminal spike of solitary, or 2- or 3-flowered bracteolate cymules. **Flowers** unisexual. **Male flowers** hypocrateriform; perianth tube short, continuous with solid receptacle; lobes 4 or 5, spreading with a tuft of hairs arising from anthers; stamens 4; filaments arising at base of perianth lobes; anthers small; ovary and style rudimentary or often 0. **Female flowers** with perianth tube very shortly campanulate or scarcely evident, adnate to ovary; lobes 4(5); disc usually obscure; staminodes rarely present; ovules 2 or 3, pendulous from apex of a central, straight or folded, filiform placenta; style short; stigma obscurely 2- or 3-lobed. **Fruit** a globose or ovoid 5-ribbed nut, conspicuously reticulated with a fleshy basal ring crowned by a persistent perianth; endocarp crustaceous; embryo terete in centre of fleshy albumen.

Species ± 8, all in sthn Afr., Western Cape from near Malmesbury to Port Elizabeth in Eastern Cape.

Thesium L. 2118000

Linnaeus: 207 (1753); Linnaeus: 205 (1754); Brown: 352 (1810); Hill: 136 (1915a); Brown: 455 (1932); Levyns: 332 (1950); Roessler: 2 (1969).

Parasitic or hemiparasitic annual or perennial herbs, shrubs or dwarf shrubs, usually glabrous. **Leaves** alternate, linear, linear-lanceolate, subulate, scale-like or rarely suborbicular. **Inflorescence** a loose or compact, terminal or axillary raceme, spike, or panicle, with leafy branches sometimes replacing flowers in axils of bracteoles. **Flowers** bisexual. **Perianth**: tube cup-shaped or tubular; lobes 5, spreading or erect, ± hooded, with or without an apical beard of hairs and usually with tuft of hairs adhering to apex of anthers; in absence of these hairs a ring of hairs occurs at throat of perianth tube at level of insertion of filaments; margins hairy, papillose or glabrous. **Stamens** 5, arising at base of perianth lobes; anthers ovoid or oblong. **Disc** often conspicuous. **Ovary** 3-merous; ovules 2–4, pendulous from apex of slender, flexuose placenta; style cylindrical or almost absent; stigma capitate or obscurely 3-lobed. **Fruit** an ellipsoid, globose or obovoid nut, usually 10-ribbed, crowned with persistent perianth. **Seed** similar in shape to fruit; embryo central with fleshy endosperm, radicle as long as or longer than cotyledons. $x = 6, 7, 8$ (2, 9, 10, 13).

Species ± 325, in temperate regions of the Old World, 2 in South America and many in Africa; over 180 in sthn Afr., widespread, particularly frequent in grassland.

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Sapindaceae

(Rosidae—Sapindales)

Compiled by R.H. Archer

Trees or shrubs, sometimes herbaceous or woody climbers with tendrils, undershrubs, or herbs, often monoecious or dioecious. **Leaves** alternate, compound or sometimes simple; stipules 0 or small (climbers). **Flowers** usually unisexual, regular or irregular, small; mainly in racemes or panicles, rarely in clusters or solitary. **Calyx** 4- or 5-segmented or united at base. **Petals** 0 or 3–5, free, equal or unequal in size, often with a scale or other appendage on face. **Disc** annular, cupular, or unilateral, rarely rudimentary. **Stamens** arising within disc, 5–24, often 8; filaments free, often hairy; anthers 2-thecous. **Ovary** superior, entire, lobed, or divided nearly to base, 2- or 3(4–6)-locular, with 1 or 2(3) axile or sometimes basal ovules in each locule; style 1(2 or 3), sometimes 3–6-fid; stigma simple, rarely lobed. **Fruit** a drupe or capsule, sometimes bladdery or winged (samara). **Seeds** usually solitary, without endosperm, often with an arillode.

Genera 147, species 2000; cosmopolitan in tropics and subtropics; sthn Afr.: genera 14, species 27.

Sonder: 236 (1860); Radlkofer: 276 (1895); Exell: 494 (1966); Friedrich-Holzhammer: 1 (1968); Fouilloy & Hallé: 1 (1973); Davies & Verdcourt: 1 (1998).

Key to genera

1a Leaves compound, rarely 1-foliolate:
2a Leaves imparipinnate or biternate or (1–)3-foliolate:
3a Herbaceous or woody, scandent with tendrils:
4a Leaves biternate or biternately compound; fruit a bladder-like capsule ..... **Cardiospermum**
4b Leaves imparipinnate; fruit an obconic, 3-valved capsule ..... **Paullinia**
3b Trees or shrubs, without tendrils:
5a Leaves (1–)3-foliolate; ovary 2-locular, with a single, basal ovule in each locule; fruit drupaceous ..... **Allophylus**
5b Leaves imparipinnate, with 5–12 pairs of leaflets; ovary 3-locular, with 2 ovules in each locule ..... **Erythrophysa**
2b Leaves 1- or 2-paripinnate:
6a Petals well developed:
7a Fruit loculicidally dehiscent, 3-locular; calyx somewhat united ..... **Blighia**
7b Fruit indehiscent:
8a Fruit composed of 2 or 3 broadly winged cocci; stamens 8 ..... **Atalaya**
8b Fruit drupaceous or baccate, cocci not winged:
9a Sepals free or almost so; stamens (6–)8(–more):
10a Fruit conspicuously lobed:
11a Flowers unisexual; stamens (8–)12–20 ..... **Deinbollia**
11b Flowers bisexual; stamens 6–10 ..... **Smelophyllum**
10b Fruit globose, obscurely 3-lobed; leaf rachis ± winged ..... **Hippobromus**
9b Sepals connate to form a saucer-shaped or campanulate tube:
12a Sepals forming a campanulate tube; petals 3 or 4, each with a 2-lobed, basal scale ..... **Pancovia**
12b Sepals forming a saucer at base; petals 5, each with a thick appendage longer than itself ..... **Smelophyllum**
6b Petals rudimentary or absent:
13a Fruit 1-locular (by abortion), indehiscent or tardily so; stamens 5 or 6; 4–14 pairs of leaflets per leaf ..... **Haplocoelum**
13b Fruit of (1)2 or 3 dorsally longitudinally dehiscent cocci; stamens 6–8; 2 or 3 pairs of leaflets per leaf..... **Stadmannia**
1b Leaves simple, sometimes 1-foliolate:
14a Leaves 1-foliolate; sepals 4; petals 4 or 0; ovary 2-locular, with a single, basal ovule in each locule ..... **Allophylus**
14b Leaves simple:
15a Petals (4)5(6); ovary 2- or 3-locular, with a single ovule in each locule; fruit globose ..... **Pappea**
15b Petals 0; ovary 2–6-locular, with 2 axile ovules in each locule; fruit angled or winged; young leaves sticky ..... **Dodonaea**

Allophylus L. 4734000

Linnaeus: 348 (1753); Radlkofer: 201 (1909); De Winter: 407 (1954); Leenhouts: 301 (1967) as monotypic genus; Fouilloy & Hallé: 20 (1973); Davies & Verdcourt 75 (1998).

Schmidelia L.: 274 (1767a); Linnaeus: 67 (1767b) name illegitimate; Sonder: 238 (1860).

Trees or shrubs, dioecious, with occasional bisexual flowers. **Leaves** (1–)3(–5)-foliolate; leaflets often relatively large and discolorous, with entire or serrated margin. **Flowers** minute, irregular; in simple, axillary racemes or in lax panicles. **Sepals** 4, in opposite pairs, imbricate, the two outer larger. **Petals** 0 or 4, glabrous or bearded on inner face. **Disc** unilateral, lobed, or of 4 glands, rarely rudimentary. **Stamens** 8, rarely less, included or shortly exserted; filaments free, usually hairy. **Ovary** 2- or 3-locular; compressed or didymous, with a single, basal ovule in each locule, often hairy; style 2- or 3-lobed, or styles free. **Fruit** of 2 fleshy, dry, or leathery, 1-locular carpels, sometimes reduced to 1 carpel. **Seeds** erect, usually globose and with a short aril. $x = 7$ or 14 (polyploidy).

Species ± 200, but with poor segregation in an exceptionally difficult genus. Leenhouts (1967), with good reasons, recognised one species only. Cosmopolitan, mainly tropical and subtropical; 8 in eastern parts of sthn Afr.

Atalaya Blume 4735000

Blume: 186 (1847); Dyer: 214 (1937); Dyer: 112 (1943); Exell: 518 (1966).

Diacarpa Sim: 33, t. 5 (1909).

Trees. **Leaves** paripinnate, rarely simple; leaflets in 2–5 pairs, alternate or opposite, lanceolate to obliquely oblong-falcate, usually entire. **Flowers** small; in terminal panicles. **Sepals** 5, suborbicular, imbricate, outer smaller than inner. **Petals** (4)5, usually with a hairy scale on inner face, ciliate. **Disc** fleshy, expanded at base with margin slightly notched. **Stamens** 8, arising within disc; filaments hairy. **Ovary** 3-locular, 3-lobed, each lobe narrowly winged; with a single ovule in each locule; style short; stigma simple. **Fruit** of 2 or 3 winged cocci, with wings distinctly veined. **Seeds** ellipsoid with papery testa. $x = 10$ or 15.

Species 8 or 9, Australia to Indochina and sthn Afr.; 3 in sthn Afr., comparatively rare; 2 mainly in Mpumalanga, Swaziland, KwaZulu-Natal, the third, rare, in Eastern Cape near Port Elizabeth and Uitenhage; also in Mozambique.

Blighia K.D.Koenig 4800000

Koenig: 571 (1806); Exell: 514 (1966).

Phialodiscus Radlk.: 479 (1879).

Trees or large shrubs, usually dioecious, sometimes spuriously polygamous. **Leaves** paripinnate, 1–3(–5)-jugate. **Flowers** regular; in axillary, often racemose clusters. **Sepals** 5, connate at base. **Petals** 5, pouch-like owing to fusion of margins of scales. **Disc** lobed. **Stamens** 8–10. **Ovary** 3-locular, 3-angled; with a single ovule in each locule. **Fruit** 3-lobed, ± 3-winged. **Seeds** with a fleshy arillode surrounding lower part. $x = 8$ or 16.

Species 3 in tropical Africa; 1 in sthn Afr.: *Blighia unijugata* Baker, in forest and woodland in KwaZulu-Natal.

Cardiospermum L. 4726000

Linnaeus: 366 (1753); Sonder: 237 (1860); Bowden: 508 (1966); Fouilloy & Hallé: 16 (1973).

Herbaceous climbers with tendrils, dioecious, with occasional bisexual flowers. **Leaves** 3-foliolate, or biternately compound, usually stipulate; leaflets lobed, toothed, or cut. **Flowers** irregular; in axillary racemes or panicles; peduncle with a pair of tendrils at summit or with abortive pedicels. **Sepals** 4, broadly imbricate, anterior and posterior ones larger. **Petals** 4, with petaloid appendages, each with a hairy, reflexed lobe near apex. **Disc** unilateral, of 2 glands between petals and stamens. **Stamens** 8; filaments unequal, free or connate at base, linear, hairy. **Ovary** 3-locular, sometimes 3-angled, sessile or stalked; with a single, axile ovule in each locule, sometimes villous; style short, 3-fid, or styles free. **Fruit** an inflated, membranous capsule. **Seeds** black, globose, with a white, ovate to reniform hilum. $x = 11$ (7, 10).

Species 12–20, predominantly tropical America; 4 in sthn Afr., Namibia, Northern Province, Mpumalanga, KwaZulu-Natal and Eastern Cape.

Deinbollia Schumach. & Thonn. 4740000

Schumacher & Thonning: 247 (1827); Exell: 521 (1966).

Trees, dioecious. **Leaves** usually paripinnate, often comparatively large, 2–many-jugate; leaflets oblong or oblong-elliptic. **Flowers** regular; in short or long, simple or branched racemes. **Sepals** 5, circular, concave, imbricate, often hairy. **Petals** 5, ± as long as sepals, woolly or with scales on inner face, often ciliate. **Disc** annular or cupular. **Stamens** (8–)12–20, arising within disc; filaments linear, pilose. **Ovary** 1-locular, deeply 2- or 3-lobed or -partite, each section subglobose, often villous; with a solitary, basal ovule; style simple, thick, straight or twisted. **Fruit** separating into 2 or 3 berry-like mericarps. **Seeds** globose or ellipsoid, with a fleshy aril or small, basal cushion. $x = 14$, 15.

Species 30–40, Africa and Madagascar; 1 in sthn Afr.: *Deinbollia oblongifolia* (Sond.) Radlk., Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Dodonaea Mill. 4831000

Miller: [450] (1754); Sonder: 241 (1860); Exell: 542 (1966); West: 1 (1984).

Trees or shrubs, dioecious or sometimes monoecious, often viscid. **Leaves** simple, entire. **Flowers** in a racemoid or paniculate thyrse. **Sepals** 3–7, imbricate or valvate. **Petals** 0. **Disc** vestigial. **Stamens** 5–8 (rudimentary in female flowers); filaments shorter than anthers. **Ovary** 2–4(–6)-locular, 2–4(–6)-angled, sessile; with 2 axile ovules in each locule (rudimentary in male flowers); style 3–6-fid, or thick and undivided. **Fruit** a membranous capsule, with 2 or 3 papery wings, often tinged pink, septicidally 2- or 3-valved, with 1 or 2 seeds in each locule. **Seeds** lenticular or subglobose, compressed. $x = 14$ (12, 15, 16) (polyploidy).

Species 68, predominantly Australia; 1 widespread in sthn Afr.: *Dodonaea viscosa* Jacq. with 2 subspecies.

Erythrophysa E.Mey. ex Arn. 4826000

Arnott: 258 (1841), as *Erythrophila*; Sonder: 237 (1860); Hutchinson: 150 (1932); Verdcourt: 201 (1962).

Shrubs or small trees. **Leaves** imparipinnate; leaflets in 5–12 pairs, elliptic to linear; leaf rachis narrowly to conspicuously winged. **Flowers** bisexual; in corymbs or panicles. **Sepals** usually 4, ± fused at base to form a cup-shaped calyx, oblique at base; lobes elliptic. **Petals** 4, with long, terete claw; limb oblong, hooded at base and with a scale or 3-lobed appendage; red. **Disc** cup-shaped or flat. **Stamens** 8, arising in a bundle beneath a fleshy gland at one side of flower where fifth petal is deficient; filaments exserted, subterete, hairy; anthers versatile. **Ovary** 3-locular, 3-angled, stalked; with 2 ovules in each locule; style short, obtuse. **Fruit** an inflated, beaked bladder. **Seeds** usually solitary in each locule, hard, purple or black, ± size of pea.

Species 5, Africa; 1 species in Ethiopia, 2 species in Madagascar; 2 in sthn Afr., 1 mainly in dry areas of Namaqualand (Northern Cape) and Free State, the other in Northern Province.

Haplocoelum Radlk. 4769000

Radlkofer: 336 (1878); Exell: 530 (1966).

Trees or shrubs, dioecious or flowers sometimes spuriously polygamous. **Leaves** paripinnate; leaflets up to 14-jugate. **Flowers** in dense, axillary clusters. **Sepals** 5 or 6. **Petals** 0. **Disc** pulvinate. **Stamens** 5 or 6, arising in centre of disc. **Ovary** 3-locular, 3-angled; with a single ovule in each locule. **Fruit** a spherical, 1-seeded, pink to red berry. **Seeds** erect, baccate; arillode dorsally split and nearly covering seed.

Species ± 7, Africa and Madagascar; 1 in sthn Afr.: *Haplocoelum gallense* (Engl.) Radlk.; subtropical bush of KwaZulu-Natal.

Hippobromus Eckl. & Zeyh. 4836000

Ecklon & Zeyher: 151 (1836); Sonder: 241 (1860); Radlkofer: 359 (1895).

Trees, monoecious or polygamous, resiniferous. **Leaves** pinnate; rachis ± winged; leaflets ± sessile, subopposite, in 3–6 pairs, margin serrate or entire. **Flowers** dimorphic, subglobose, velvety; in dense panicles. **Sepals** 5, unequal, either elliptic or spatulate, concave, fimbriate or ciliate. **Petals** 5, shorter than sepals, obovate, without scales, imbricate. **Disc** thick, annular. **Stamens** 8, arising within disc, longer than calyx; filaments terete; anthers oblong. **Ovary** 3-locular, subglobose; with 1 or 2 ovules in each locule; style short, thick; stigma 3-angled. **Fruit** globose, fleshy, obscurely 3-lobed, 1- or 2-seeded. **Seeds** flattened, without an aril.

Species 1: *Hippobromus pauciflorus* (L.f.) Radlk., Northern Province, Mpumalanga to KwaZulu-Natal and Eastern Cape near Uitenhage and Port Elizabeth.

Pancovia Willd. 4753000

Willdenow: 285 (1799) name conserved; Exell: 525 (1966).

Trees or shrubs, dioecious, monoecious, or polygamous. **Leaves** paripinnate, petiolate; leaflets 2–12-jugate. **Flowers** irregular; in congested, axillary or terminal fascicles, racemes or panicles. **Sepals** 4 or 5, unequal, ± connate. **Petals** 3 or 4, unguiculate, each with a 2-lobed, basal scale. **Disc** unilateral. **Stamens** 6–9, in an excentric bundle, reduced in bisexual flowers. **Ovary** 3-locular; with a single ovule in each locule; much reduced or 0 in male flowers. **Fruit** fleshy, indehiscent; carpels almost connate or united only at base, 1 or 2 often aborted. **Seeds** elliptic, laterally compressed, without arillode. $x = 8$ or 16.

Species 10–12, Africa; 1 in sthn Afr.: *Pancovia golungensis* (Hiern) Exell & Mendonça, Zululand (KwaZulu-Natal); also in Mozambique.

Pappea Eckl. & Zeyh. 4784000

Ecklon & Zeyher: 53 (1834/1835); Exell: 540 (1966); Fivaz & Robbertse: 342 (1993).

Shrubs or trees, monoecious, producing male and then female flowers either on the same inflorescence or on separate inflorescences. **Leaves** simple, usually petiolate, oblong or obovate, entire or sometimes toothed, especially on coppice shoots. **Flowers** small, regular; in panicles or racemes. **Sepals** 5, small, connate to form a cupular or saucer-shaped calyx; lobes ovate. **Petals** 4–6, ± as long as calyx, villous within. **Disc** small, annular. **Stamens** 8–10, arising within disc; filaments villous. **Ovary** 2- or 3-locular, 2- or 3-lobed, hirsute, with a solitary ovule in each locule; style short, thick; stigma simple. **Fruit** usually globose, velvety, green to brown, with 1 or 2 locules aborting; splitting to reveal a seed enclosed in a jelly-like, orange-red arillode. **Seeds** globose, black, shiny, with basal, circular depression.

Species 1, Africa: *Pappea capensis* Eckl. & Zeyh., very variable, widespread.

Paullinia L. 4724000

Linnaeus: 365 (1753); Exell: 512 (1966); Davies & Verdcourt: 102 (1998).

Woody slender climbers, monoecious, often with coiled tendrils at base of inflorescence; stems cable-like, appearing to be composed of several coalescent axes. **Leaves** imparipinnate; petiole and rachis commonly winged; stipulate; leaflets 2-jugate. **Flowers** slightly irregular; in an axillary thyrse, simple, branched or clustered. **Sepals** 5, unequal, 2 inner ones connate at base. **Petals** 4, with prominent scale. **Disc** unilateral with 4 glands. **Stamens** and **staminodes** 8, excentric; filaments shortly connate at base. **Ovary** stalked, 3-locular, sometimes 3-angled, pubescent; with a single ovule in each locule; style trifid. **Fruit** a 3-valved, obovoid capsule, sometimes spiny, dehiscing into 3 valves. **Seeds** borne on central axis, black with white aril. $x = 12$.

Species ± 200 in tropical and subtropical America; 1 species: *Paullinia pinnata* L. throughout tropical Africa, reaching as far south as sthn Afr. in NE Botswana.

Smelophyllum Radlk. 4754000

Radlkofer: 330 (1878); Palgrave: 531 (1977).

Trees. **Leaves** pinnate, petiolate; leaflets in 3 or 4 pairs, obtusely toothed and undulate on margin. **Flowers** bisexual, regular; in axillary panicles shorter than leaves. **Sepals** 5, connate at base to form a saucer-shaped calyx with small lobes. **Petals** 5, slightly longer than calyx, ± quadrate, reflexed at apex, each with a thick appendage longer than petal. **Disc** cupular. **Stamens** 6–10; filaments subterete. **Ovary** 2- or 3-locular; with a solitary, basal ovule in each locule; style short, thick; stigma simple. **Fruit** 2-lobed, with fleshy pericarp. **Seeds** without an aril.

Species 1: *Smelophyllum capense* Radlk., Eastern Cape, forest areas of Port Elizabeth, Uitenhage, Humansdorp and Uniondale Districts.

Stadmannia Lam. 4785000

Lamarck: 443, t. 312 (1793); Exell: 533 (1966) as *Stadmania*; Davies & Verdcourt: 32 (1998) as *Stadmania*.

Trees up to 20 m tall, monoecious; with greyish tomentose, glabrescent branchlets. **Leaves** paripinnate, 2- or 3-jugate, up to 150 mm long, tomentellose, glabrescent. **Flowers** unisexual; in compact, racemose, terminal or axillary clusters up to 100 mm long. **Sepals** 5, short, somewhat connate. **Petals** 0. **Disc** small, 5-crenate. **Stamens** (6)8; filaments short, arising within disc. **Ovary** 3-locular, 3-sulcate; with a single basal ovule in each locule. **Fruit** usually of 1 developed, globose, golden yellow mericarp dehiscing along a vertical line. **Seeds** ± 10 mm diameter, covered by an arillode.

Species 1, eastern tropical and subtropical Africa, Madagascar and Réunion: *Stadmannia oppositifolia* Poir. subsp. *rhodesica* Exell, extends into the Kruger National Park in Northern Province and Mpumalanga.

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Sapotaceae

(Dilleniidae—Sapotales)

Compiled by C.L. Bredenkamp

Trees or shrubs, generally with milky latex and 2-armed hairs (1 arm often reduced or 0). **Leaves** alternately or spirally arranged, simple, entire, petiolate, often leathery; stipules present or 0, usually falling early. **Flowers** regular, usually bisexual or sometimes female by reduction of stamens, solitary or in axillary clusters or on bare branches or stems, white or cream, scented, often bat-pollinated. **Calyx** with sepals ± free, either in 1 whorl with (4)5(6), or in 2 whorls with 3 or 4 sepals each. **Corolla** with a short cylindric to campanulate tube with 1 or 2 whorls of 2–5 entire, lobed to divided petals. **Stamens** as many as corolla lobes and opposite them or more numerous and in 2 whorls, arising on corolla; filaments often shorter than anthers; anthers with longitudinal slits; staminodes sometimes present. **Ovary** superior, 5–many locules, with 1 ascending ovule per locule; placentation basal or axile-basal; style simple, conical or cylindric; stigma usually indistinct, acute to capitellate. **Fruit** a 1–many-locular berry. **Seeds** often solitary and large with hard, usually shiny testa.

Genera 50–100, difficult to define, species ± 1000, pantropical, mostly in humid forest, but some genera (e.g. *Sideroxylon*) extending into semi-arid and arid regions; sthn Afr.: genera 7, species 14.

Jussieu: 151 (1789); Meeuse: 31 (1963); Hemsley: 472 (1966); Kupicha: 210 (1983); Pennington: 117 (1991).

Key to genera

1a Flowers (4)5(6)-merous; sepals in a single whorl or at least not manifestly in 2 whorls:
- 2a Petals deeply 3-lobed ..... **Inhambanella**
- 2b Petals entire:
  - 3a Secondary veins of leaves inconspicuous, surface of lamina divided into small polygonal areoles by tertiary vein reticulation; seeds subspherical, faintly 5-ribbed with small basal scar ..... **Sideroxylon**
  - 3b Secondary veins of leaves easily distinguished, lamina not clearly marked into small polygonal areoles; seeds ± compressed-ellipsoid with long lateral scar:
    - 4a Fruit usually 3–5-seeded; seeds laterally compressed, with a hard and shiny testa; endosperm copious ... **Chrysophyllum**
    - 4b Fruit 1(2)-seeded; seeds not much compressed; endosperm absent ..... **Englerophytum**

1b Flowers 3- or 4(5)-merous: sepals manifestly in 2 whorls; petals usually with conspicuous, lateral appendages:
- 5a Flowers generally 4-merous; sepals 8 in 2 dissimilar whorls:
  - 6a Seeds laterally flattened, with small, basal, circular scar; endosperm present ..... **Mimusops**
  - 6b Seeds ellipsoid, not or only slightly laterally compressed, with large scar; endosperm absent ..... **Vitellariopsis**
- 5b Flowers generally 3-merous; sepals 6 in 2 dissimilar whorls; stamens as many as calyx lobes ..... **Manilkara**

Chrysophyllum L. 6377000

Linnaeus 192 (1753); Harvey & Wright: 436 (1906); Meeuse: 326 (1960); Meeuse: 35 (1963); Kupicha: 211 (1983); Pennington: 216 (1991).

Trees or shrubs. **Leaves** with many, closely parallel lateral veins; stipules absent. **Flowers** generally 5-merous, axillary or on naked branches below leaves, solitary or in fascicles. **Corolla tube**: short, cylindric, urceolate or campanulate; petals entire, imbricate. **Stamens** usually short; anthers versatile, ± dorsifixed, ovate to triangular, sometimes somewhat sagittate, often apiculate. **Ovary** pubescent; style columnar, short, thick, glabrous. **Fruit**

usually 3–5-seeded. **Seeds** with long and narrow, ventral scar; testa hard, smooth and shiny; endosperm copious. $x = 13$ (12) (polyploidy).

Species ± 80, especially in the Neotropics, ± 15 in Africa, 10 in Madagascar, and 2 or 3 extending from India to Malesia and Australia; 1 in sthn Afr.: *Chrysophyllum viridifolium* J.M.Wood & Franks, Swaziland, KwaZulu-Natal and Eastern Cape.

Englerophytum K.Krause 6377020

Krause: 343 (1914); Aubréville: 252 (1961); Liben: 151 (1989); Pennington: 250 (1991); Bredenkamp: 235 (1993).

Beguaertiodendron De Wild.: 22 (1919); Heine & Hemsley: 306 (1960); Aubréville: 252 (1961); Meeuse: 36 (1963); Hemsley: 18 (1968); Aubréville: 432 (1971); Kupicha: 222 (1983); Steyn: 440 (1990). *Chrysophyllum* in sense of Harvey & Wright: 436 (1906) in part. *Pouteria* in sense of Meeuse: 332 (1960) in part.

Shrubs or trees. **Leaves** spirally arranged; venation brochidodromous, usually with a submarginal vein, secondaries usually close and parallel, higher order venation parallel to secondaries, leaves appearing coarsely striate; stipules usually present, but caducous. **Inflorescence** axillary, ramiflorous or cauliflorous. **Flowers** in fascicles, bisexual or unisexual. **Calyx** a single whorl of 5(6) free or slightly united, quincuncial sepals. **Corolla** shortly tubular or cyathiform; lobes 5(–10), often widely spreading, simple, aestivation imbricate or quincuncial. **Stamens** 5(–10), arising at top of corolla tube, usually exserted; filaments usually well developed, and often partially or completely fused into a short tube or thick fleshy collar; anthers usually extrorse, glabrous; stamens sometimes converted into petaloid staminodes in female flowers, as a single whorl of small, subulate structures alternating with stamens. **Ovary** (4)5(–10)-locular; placentation axile; style included or slightly exserted. **Fruit** a 1-seeded berry. **Seeds** ellipsoid, not or only slightly laterally compressed; testa smooth, often thin; scar adaxial; variable in width from narrow to broad, and sometimes extending to cover most of seed surface; embryo with plano-convex cotyledons; radicle extending to the surface; endosperm absent.

Species 5–10, poorly defined and variable species in tropical Africa; 2 in sthn Afr.; forest and bush of Botswana, Northern Provice, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Inhambanella (Engl.) Dubard 6386030

Dubard: 42 (1915); Hemsley: 45 (1968); Kupicha: 232 (1983); Pennington: 140 (1991).

Lecomtedoxa in sense of Meeuse: 343 (1960).

Trees attaining impressive size. **Leaves** coriaceous, glabrous; stipules caducous. **Flowers** in fascicles in axils of leaves or leaf scars. **Sepals** (3)4–6, imbricate. **Corolla** usually 4–6-lobed; lobes each with a middle and 2 lateral segments. **Stamens** 5, arising from throat of corolla tube; anthers apiculate; staminodes lanceolate, ovate-lanceolate to narrowly triangular. **Ovary** 5(6)-locular, pubescent; ovules with lateral attachment; style glabrous, short, capitate or tapering to apex. **Fruit** 1-seeded. **Seed** large, with long scar on ventral side; testa crustaceous.

Species 2, one in West Africa, the other in East Africa and sthn Afr.: *Inhambanella henriquesii* (Engl. & Warb.) Dubard in N KwaZulu-Natal.

Manilkara Adans. 6386010

Adanson: 166 (1763) name conserved; Meeuse: 48 (1963); Roessler: 1 (1967); Pennington: 128 (1991).

Mimusops in sense of Harvey & Wright: 439 (1906) in part. *Muriea* M.M.Hartog: 145 (1878); Meeuse: 52 (1963) in part.

Trees or large shrubs. **Leaves** usually crowded at tips of branches; stipules caducous or 0. **Flowers** axillary, usually in axils of lower leaves or scars. **Sepals** 6(8), in 2 whorls, often broad. **Corolla** 6(8)-lobed, each lobe with 2 dorsal appendages. **Stamens** 6(8) arising from throat of corolla tube; filaments usually longer than the short anthers; staminodes 6(8) or sometimes fewer, usually small, but not absent, often dentate, fimbriate or lobed, glabrous, not incurved. **Ovary** 6–16-locular; ovules ventrally or basiventrally attached. **Fruit** 1–several-seeded. **Seeds** laterally compressed; testa hard and brittle; scar conspicuous, rarely small. $x = 12$.

Species ± 70, pantropical, 30 species in America, ± 20 in Africa and Madagascar and ± 15 in Asia and the Pacific; 4 in sthn Afr., Namibia, Botswana, Northern Provice, Mpumalanga, Swaziland and KwaZulu-Natal.

Mimusops L. 6386000

Linnaeus: 349 (1753); Harvey & Wright: 439 (1906); Meeuse: 44 (1963); Hemsley: 50 (1968); Kupicha: 233 (1983); Pennington: 120 (1991).

Trees or shrubs. **Leaves** not particularly crowded, secondary veins not conspicuously parallel; stipules present. **Flowers** axillary, pedicellate. **Calyx** 8-lobed, divided nearly to base, in 2 whorls. **Corolla** 8-lobed, each lobe with 2 dorsal appendages; appendages often in an outer row of 16 and petals in an inner row of 8. **Stamens** arising from throat of corolla tube; filaments usually shorter than the lanceolate, apiculate anthers; staminodes 8, entire or somewhat dentate, lacerate or fimbriate at apex, usually pubescent. **Ovary** 8-locular; ovules with basal attachment; style slender. **Fruit** 1–few-seeded. **Seeds** with small, circular, basal scar; endosperm copious; cotyledons thin. $x = 12$.

Species ± 40: ± 20 species in Africa, 15 in Madagascar, 4 in the Mascarenes, 1 in the Seychelles, and 1 in Asia and the Pacific; 3 in sthn Afr., Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Sideroxylon L. 6368000

Linnaeus: 192 (1753); Harvey & Wright: 438 (1906); Meeuse: 322 (1960); Meeuse: 33 (1963); Kupicha: 230 (1983); Pennington: 166 (1991).

Trees or shrubs. **Leaves** dark green, glossy on upper surface. **Flowers** 5-merous throughout, all whorls single. **Corolla** lobes without lateral appendages. **Stamens** arising from throat of corolla tube; staminodes petaloid, with a broad base, alternipetalous. **Ovary** with basally attached seed. **Fruit** 1-seeded. **Seeds** depressed-globose, usually ± 4- or 5-angled and somewhat ribbed, with small, circular scar in a basal depression; testa thick, bony; endosperm copious; cotyledons thin. $x = 12, 13$.

Species ± 75: 49 in the Neotropics, ± 25 elsewhere (6 Africa, 6 Madagascar, 8 Mascarenes, 4 Asia, 1 in NW Pakistan, Afghanistan, Oman, Somalia, Ethiopia, Djibouti); 1 in sthn Afr.: *Sideroxylon inerme* L., in subtropical and temperate forests of the Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Vitellariopsis Baill. ex Dubard 6386010

Dubard: 44 (1915); Hemsley: 59 (1968); Kupicha: 240 (1983); Pennington: 123 (1991).

Austrominusops Meeuse: 347 (1960); Meeuse: 42 (1963).

Shrubs or medium-sized trees. **Leaves** crowded at tips of branches, firm, but not coriaceous; stipules 0. **Flowers** in axils of leaves or of scaly bracts, 1–4 together, appearing to be in umbels of up to 20 flowers or more, because of density of leaves; pedicels usually ± pendulous. **Calyx** 6- or 8(10)-lobed, in 2 whorls, divided nearly to base. **Corolla** 3- or 4-merous; tube short; lobes

and lateral appendages subequal. **Stamens** 6 or 8; anthers longer than filaments, apiculate; staminodes usually entire, concave and pubescent on outer surface. **Ovary** 6- or 8-locular, usually subglobose; ovules with lateral or basilateral attachment; style terete, subacute or obtuse. **Fruit** 1(2)-seeded. **Seed** with thin testa and broad scar on ventral side; endosperm absent; cotyledons thick and fleshy.

Species 6, E and S Africa; 2 in sthn Afr., Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

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Scrophulariaceae

(Asteridae—Scrophulariales)

Compiled by S.J. Smithies

Annual or perennial, terrestrial, amphibious or aquatic herbs, sometimes undershrubs, rarely shrubs or small trees, sometimes hemiparasitic or holoparasitic on roots and lacking chlorophyll. **Stems** cylindrical or quadrangular, sometimes ribbed or narrowly winged. **Leaves** opposite and/or alternate, or rarely whorled, sometimes fascicled or radical, simple, entire to deeply divided, rarely reduced to scales or aborted; stipules 0. **Flowers** bisexual, strongly to slightly irregular, rarely subregular or regular, pedicellate or not, solitary axillary or in terminal or at times subterminal and lateral cymes or racemes, in such forms as spikes, heads, panicles or thyrses. **Bracts** opposite or alternate, free or adnate to pedicel, rarely to calyx; bracteoles 0 or 2. **Calyx** usually (4)5-lobed, or rarely, by modification, 2- or 3-lobed or spathaceous, usually ± united, persistent, tube from almost lacking to long, usually cylindrical to campanulate; lobes equal or not, valvate, variously overlapping or open in bud. **Corolla** sympetalous, (3)4- or 5(6–8)-lobed, usually campanulate, cylindrical or ventricose or enlarged above, or bilabiate with upper (posterior) lip entire, 2- or sometimes 4-lobed, erect, concave, ± hooded, flat or spreading; lower (anterior) lip (1)3(4)-lobed, spreading; sometimes corolla ± unilabiate with tube split in front and limb of 4(5) lobes; tube straight, or variously curved to geniculate, at times oblique, sometimes with 1 or 2 spurs, sacs or hollows at base or in throat; lobes subequal or posterior pair shorter, ± spreading. **Stamens** usually 4, didynamous or at times ± equal, or 2 with sometimes 2 reduced to staminodes, or 5 with fifth subrudimentary, rarely perfect, alternating with corolla lobes, exserted or included; filaments arising in corolla tube or at throat, filiform or dilated, free, confluent or decurrent down tube, occasionally with lower pair variously appendaged at base, there sometimes anterior filaments twisted around and thus occupying posterior position; anthers usually bithecate, sometimes synthecate (at length unithecate by confluence of 2 thecae), at times unithecate, free or often coherent; thecae equal or with one smaller and at times sterile; staminodes 0, 1 or 2. **Nectary/disc** various, often annular or unilateral at base of ovary, sometimes obsolete. **Ovary** superior, bilocular (rarely ± unilocular or trilocular), sessile, entire, with carpels median; placentas central, adnate to septum or rarely parietal; ovules usually many, sometimes few or 1 per locule, often seated on pulvinate funicle with central depression; style terminal, simple, usually filiform; stigma entire or 2(3)-lobed. **Fruit** usually a capsule, loculicidal and/or septicidal, sometimes dehiscing by pores or by meridional fissures, or indehiscent and then at times separating into 2 1-seeded nutlets (cocci), or rarely 1 nutlet by abortion, seldom a berry, rarely a fleshy drupe. **Seeds** small to minute, 1–many per locule, variously shaped, pitted, furrowed, ridged, ribbed or winged, rarely smooth; embryo straight to weakly curved; endosperm oily.

Genera ± 290, species ± 4500 (including *Orobanchaceae, Selaginaceae & *Charadrophila*); cosmopolitan but especially temperate areas and tropical mountains; sthn Afr.: ± 80 genera, ± 760 species, widespread.

Choisy: 71 (1823); Bentham: 186 (1846); Bentham: 913, 1126 (1876); Wettstein: 39 (1891/1893); Hallier: 181 (1903); Hiern: 121 (1904); Hiern & Stapf: 421 (1904); Hemsley & Skan: 261 (1906); Merxmüller & Roessler: 1 (1967a); Merxmüller & Roessler: 1 (1967b); Webb: 202 (1972); Hilliard & Burtt: 155 (1977); Visser: 82 (1981); Sutton: 1 (1988); Hilliard & Burtt: 179 (1989); Hilliard: 315 (1990); Philcox: 1 (1990); Brummitt: 665 (1992); Fischer: 1 (1992); Hilliard: 1 (1994); Mielcarek: 3 (1996); Steiner: 63 (1996); Mabberley: 1 (1997); Retief & Herman: 548, 603, 617 (1997); Takhtajan: 451 (1997); Hilliard: 1 (1999).

Classification and delimitation of the Scrophulariaceae are problematical, and in its present circumscription the family is not considered monophyletic (Olmstead & Reeves 1995). The Selaginaceae, established as a family by Choisy (1823), and accepted as such by Dyer (1975), Dahlgren

(1980), Cronquist (1988, under Globulariaceae) and Hartley & Balkwill (1990), is here included in Scrophulariaceae. This is in agreement with, among others, Hilliard (1990, 1994 and 1999), Philcox (1990), Brummitt (1992), Mielcarek (1996) and Takhtajan (1997).

*Orobanchaceae is also difficult to separate from Scrophulariaceae. Some genera have been moved back and forth between them, such as *Buchnera* L., *Harveya* Hook., *Hyobanche* L. and **Orobanche* L. The two families have been treated as distinct by, for example, Cronquist (1988), Kreutz (1995) and Mabberley (1997). Others recognise *Orobanchaceae as part of Scrophulariaceae, such as Brummitt (1992), Thorne (1992), Mielcarek (1996) and Takhtajan (1997), and they are followed here.

Recent research is leading to publication of other classification schemes. For instance, based on evidence from morphology, DNA base-pair sequences and chemistry, Judd *et al.* (1999) divide the genera here placed under Scrophulariaceae into three families which they consider monophyletic:

1. Scrophulariaceae, which includes the closely related *Scrophularia* L. and **Verbascum* L. These two genera are seen as closely linked phenetically to *Selago* L. and relatives (Selagineae) by the intermediate group of *Sutera* Roth and relatives (Manuleae).
2. Plantaginaceae, which comprises *Plantago* L., *Bacopa* Aubl., *Limnophila* R.Br., **Linaria* Mill., *Lindernia* All., *Mimulus* L., *Nemesia* Vent., **Scoparia* L. and others.
3. *Orobanchaceae, which includes the parasitic genera, such as **Orobanche* L. and *Harveya* Hook.

Oftia Adans. and *Hiernia* S.Moore, listed by Dyer (1975) under Scrophulariaceae, are retained under that family, the first with reservation. *Oftia* has been placed in Verbenaceae, Myoporaceae, Scrophulariaceae or in a separate family of its own. Takhtajan (1997) placed it in Oftiaceae, next to the Scrophulariaceae, but noted it shows similarities with *Teedia*, in the last family. *Oftia* is regarded here as an anomalous genus in Scrophulariaceae. *Charadrophila* Marloth, usually placed under Gesneriaceae (also by Dyer 1975), was transferred by Weber (1989) to Scrophulariaceae, mainly because of its capsular fruits. This was accepted by Brummitt (1992) and Mabberley (1997) and is followed here. In Scrophulariaceae the genus occupies an isolated position, possibly near *Alonsoa* Ruiz & Pav. (Weber 1989), although it has features aligning it with the Rhinanathoideae.

Some exotic species of genera such as **Cymbalaria* Hill, **Linaria* Mill., *Mimulus* L., **Verbascum* L. and *Veronica* L. are widely cultivated and may occur as garden escapes. Others are found as weeds, for example **Kickxia* Dumort., **Scoparia* L., **Misopates* Raf. and **Orobanche* L.

Synopsis of Classification

The sthn Afr. genera of Scrophulariaceae can be classified as follows, based mainly on the classification system of Takhtajan (1997) and groupings of genera into tribes by Hilliard (1994, 1999), Fischer (1992), Barringer (1993) and Steiner (1996 and pers. com. 2000). However, relationships are far from definite and several genera are of very uncertain affinity (marked by ? in the scheme below).

I. Subfamily SCROPHULARIOIDEAE
   1. Tribe **Verbasceae**: **Verbascum*
   2. Tribe **Aptosimeae**: *Anticharis*, *Aptosimum*, *Peliostomum*
   3. Tribe **Hemimerideae**: *Alonsoa*, ? *Charadrophila*, ? *Colpias*, *Diascia*, *Diclis*, *Hemimeris*, ? *Nemesia*
   4. Tribe **Antirrhineae**: **Cymbalaria*, **Kickxia*, **Linaria*, **Misopates*
   5. Tribe **Bowkerieae**: *Anastrabe*, *Bowkeria*, *Ixianthes*, ? *Colpias*
   6. Tribe **Freylinieae**: *Freylinia*, *Phygelius*
   7. Tribe **Cheloneae** (but probably not related to American ones): ? *Dermatobotrys*, ? *Halleria*, ? *Oftia*, *Teedia*
   8. Tribe **Manuleae**: *Antherothamnus*, *Camptoloma*, *Glekia*, *Glumicalyx*, *Jamesbrittenia*, *Lyperia*, *Manulea*, *Manuleopsis*, *Melanospermum*, *Phyllopodium*, *Polycarena*, *Reyemia*, *Strobilopsis*, *Sutera*, *Tetraselago*, *Trieenea*, *Zaluzianskya*
   9. Tribe **Selagineae**: *Chenopodiopsis*, *Cromidon*, *Dischisma*, *Globulariopsis*, *Gosela*, *Hebenstretia*, *Microdon*, *Pseudoselago*, *Selago*
   10. Tribe **Gratioleae**: *Bacopa*, ? *Dintera*, *Dopatrium*, *Limnophila*, *Limosella*, *Mimulus*, ? **Scoparia*, *Stemodiopsis*
   11. Tribe **Lindernieae**: *Chamaegigas*, *Craterostigma*, *Crepidorhopalon*, *Lindernia*, *Torenia*

II. Subfamily RHINANTHOIDEAE
   1. Tribe **Veroniceae**: ? **Scoparia*, *Veronic*
   2. Tribe **Buchnereae**: *Alectra*, *Buchnera*, *Buttonia*, ? *Charadrophila*, *Cycnium*, *Gerardiina*, *Graderia*, *Harveya*, *Hiernia*, *Hyobanche*, *Melasma*, ? **Orobanche*, *Rhamphicarpa*, *Sopubia*, *Striga*
   3. Tribe **Rhinantheae**: *Bartsia*

Genera of uncertain affinity

Charadrophila, *Colpias*, *Dermatobotrys*, *Dintera*, *Halleria*, *Nemesia*, *Oftia*, **Orobanche*, **Scoparia*

Key to genera

1a Ovary with 1 ovule in each locule; fruit consisting of 2(1) ± ovoid cocci:
   2a Two lateral corolla lobes ascending and united with 2 posterior (upper) lobes to form a 4-lobed upper lip, anterior (lower) lobe aborted or reduced to a small tooth:
      3a Calyx campanulate, 5-lobed or 5-toothed ..... **Chenopodiopsis**
      3b Calyx of 1 or 2 segments:
         4a Calyx of 2 segments ..... **Dischisma**
         4b Calyx of 1 segment ..... **Hebenstretia**
   2b Corolla limb usually with a 1- or 2-lobed upper lip and 3-lobed lower lip, occasionally upper lip 4-lobed with one well-developed anterior lobe:
      5a Ovary with 1 locule aborted or lacking an ovule:

6a Corolla limb herbaceous, corolla tube funnel-shaped (caution: *Selago luxurians* may have only 1 fertile locule and such a corolla but it has no orange/yellow patch in corolla throat as has *Globulariopsis*)..... **Globulariopsis**

6b Corolla limb leathery, corolla tube long, cylindrical, expanding somewhat at top:

7a Calyx lobed at least halfway to base; bracts free from calyx..... **Gosela**

7b Calyx very shortly toothed; bracts adnate to at least part of calyx tube..... **Microdon**

5b Ovary bilocular with an ovule in each locule:

8a Corolla limb always glabrous on inner surface:

9a Bracts free from calyx; ovary ellipsoid to elongate; flowers sessile..... **Gosela**

9b Bracts usually adnate to pedicel and calyx tube, sometimes free from latter; ovary subglobose or ovoid; flowers sessile to petiolate..... **Selago**

8b Corolla limb with conspicuous 1-celled clavate hairs at base of upper lip, often all round mouth:

10a Calyx divided more than halfway into 5 narrowly triangular lobes, becoming indurated (hardened) in most species..... **Pseudoselago**

10b Calyx divided much less than halfway (except sometimes the posterior lobe) into 3 or 5 lobes, at least the anterior pair broadly deltoid, never indurated..... **Cromidon**

1b Ovary with 2–many ovules in each locule; fruit a capsule, berry or drupe:

11a Lobes of posterior (upper) corolla lip entirely or sometimes only partly interior in bud (covered by lobes of anterior lip); many holoparasites or hemiparasites: (11b after 30b)

12a Plants holoparasitic, lacking chlorophyll, or apparently so because of other colouring masking green colour; leaves scale- or bract-like or aborted:

13a Flowers in dense, often subcorymbose to head-like spikes; corolla limb 3-lobed..... **Hyobanche**

13b Flowers usually in more lax racemes or spikes, sometimes dense above and lax below, rarely in dense heads; corolla limb 5- or 4-lobed:

14a Corolla tube bent abruptly above middle; anthers unithecate..... **Striga**

14b Corolla tube straight or somewhat curved but not abruptly bent as above; anthers bithecate but sometimes thecae unequal and one may be subobsolete:

15a Corolla distinctly bilabiate; ovary unilocular with parietal placentation; seeds subglobose..... ***Orobanche**

15b Corolla subregular to somewhat bilabiate; ovary bilocular with axile placentation; seeds linear, clavate or oblong:

16a Corolla yellow or orange with red or markedly darker veins; anther thecae equal or unequal, all fertile... **Alectra**

16b Corolla variously coloured, if yellow, without darker veins; anther thecae unequal, one fertile, one barren or subobsolete..... **Harveya**

12b Plants not apparently or actually holoparasitic, but often hemiparasitic; leaves with chlorophyll:

17a Calyx and corolla 4(5)-lobed, if 5-lobed then corolla subrotate and calyx not hairy inside:

18a Stamens 2..... **Veronica**

18b Stamens 4:

19a Woody subshrubs; glabrous or minutely pubescent; corolla regular, rotate..... ***Scoparia**

19b Viscid-pubescent annuals; corolla bilabiate, almost personate..... **Bartsia**

17b Calyx with 5(4) lobes or teeth, if with 4 then calyx with 7, 8, 10 or 11 ribs or veins:

20a Shrubs or subshrubs:

21a Plants climbing; hemiparasitic; leaves petiolate..... **Buttonia**

21b Plants not climbing; not parasitic; leaves sessile:

22a Plants with branches opposite, spreading ± at right angles; flowers ebracteolate; corolla tube as long as calyx tube; anthers exserted..... **Hiernia**

22b Plants with branches not spreading ± at right angles; flowers bibracteolate; corolla tube longer than calyx tube; anthers included..... **Graderia**

20b Herbs, often hemiparasitic:

23a Anthers with 2 fertile, equal, to somewhat unequal thecae:

24a Calyx enlarged and inflated in fruit..... **Melasma**

24b Calyx not enlarged and inflated in fruit:

25a Flowers yellow or orange, sessile or subsessile, in spikes or subspikes..... **Alectra**

25b Flowers shades of purple, violet or blue, pedicellate, in racemes, sometimes appearing cymose:

26a Short herbs (to ± 0.15 m); stems ± decumbent, softly pilose; leaves broadly elliptical, petiolate; flowers bibracteolate; pedicels recurved in fruit..... **Charadrophila**

26b Tall herbs (0.35–0.8 m); stems ± erect, hispid; leaves linear-lanceolate, sessile; flowers ebracteolate; pedicels not recurved..... **Gerardiina**

23b Anthers unithecate or with 1 fertile theca and 1 variously modified theca:

27a Anthers bithecate, with 1 fertile theca and 1 narrow, sterile one; corolla subcampanulate..... **Sopubia**

27b Anthers all unithecate; corolla tube ± cylindrical or gradually widening above:

28a Corolla tube rather sharply curved at or above the middle and often dilated at the curve; anthers basifixed..... **Striga**

28b Corolla tube straight or sometimes slightly curved; anthers dorsifixed:

29a Flowers small, sessile or subsessile, usually in spikes or globose clusters, corolla lobes subequal, ovary elliptical..... **Buchnera**

29b Flowers large, usually petiolate and in racemes (rarely sessile and in spikes); corolla lobes unequal; ovary ovate, ovoid or globose:

30a Stamens didynamous, arising at 2 levels in corolla tube; style never exceeding lowest pair of stamens ..... **Cycnium**

30b Stamens equal in length, arising at 1 level in corolla tube; style exceeding stamens ..... **Rhamphicarpa**

11b Lobes of posterior (upper) corolla lip exterior in bud (covering lobes of anterior lip); herbs, undershrubs, or sometimes small trees:

31a Leaves alternate, very rarely opposite; corolla without pouches, pockets or spurs:

32a Corolla tube very short, narrow, or sometimes somewhat campanulate ..... ***Verbascum**

32b Corolla tube elongated, comparatively broad with wide open throat:

33a Herbs erect; fertile stamens 2 ..... **Anticharis**

33b Low undershrubs or subherbaceous plants, erect to procumbent; stamens 4:

34a Capsules thick-walled, obovoid or ± globose to ovoid, compressed in upper part at right angles to septum, emarginate, opening only above; anthers of posterior pair of stamens smaller than others, sometimes empty (caution: 2 species of *Aptosimum* have *Peliostomum*-type fruits. See note under that genus.) ..... **Aptosimum**

34b Capsules thin-walled, narrowly elongate-ovoid, acute, acuminate or obtusely pointed, opening ± down to base; all 4 anthers fertile and of ± equal size ..... **Peliostomum**

31b Leaves usually opposite at least near base, sometimes rosulate or verticillate, occasionally alternate above; corolla tube sometimes with pouches, pockets or spurs:

35a Corolla with pouches, pockets or spurs, usually near base (caution: in *Diascia* such inflations rarely absent or corolla throat only slightly depressed, then yellow patches or oil-secreting hairs sometimes present there and seeds usually curved):

36a Flowers resupinate (inverted by twisting of stalk); corolla tube split to base ..... **Alonsoa**

36b Flowers not resupinate; corolla tube not split, even if very short:

37a Corolla tube very short or obsolete; various inflations usually present in corolla throat or at base of limb:

38a Stamens 4 ..... **Diascia**

38b Stamens 2 ..... **Hemimeris**

37b Corolla tube somewhat elongated with various inflations at base:

39a Corolla tube with 2 small hollows or short pouches at base ..... **Colpias**

39b Corolla tube with only 1 hollow, pouch or spur at base:

40a Herbs:

41a Anther thecae confluent; capsule dehiscing septicidally and/or loculicidally:

42a Capsule ± ovate or urceolate, laterally compressed, septicidal; posterior corolla lip 4-lobed..... **Nemesia**

42b Capsule subglobose, loculicidal; posterior corolla lip 2-lobed ..... **Diclis**

41b Anther thecae separate, distinct; capsule dehiscing as above or opening by 1 or more pores:

43a Corolla tube pouched; capsule opening by 3 pores ..... ***Misopates**

43b Corolla tube with conical to cylindrical spur at base; capsule opening either by single pore or meridional fissures:

44a Capsule locules each opening by single apical pore, with detachable lid ..... ***Kickxia**

44b Capsule locules dehiscing by several meridional fissures:

45a Leaves palmately veined, reniform to orbicular, petiolate ..... ***Cymbalaria**

45b Leaves not so veined, usually narrow, ± sessile ..... ***Linaria**

40b Shrubs or small trees:

46a Leaves closely set and overlapping; calyx 3-partite; stamens 2, plus 2 or 3 staminodes ..... **Ixianthes**

46b Leaves not usually dense; calyx 5-lobed; stamens 4, all perfect:

47a Hairs stellate; leaves opposite or nearly so; calyx with valvate aestivation ..... **Anastrabe**

47b Hairs simple; leaves usually ternate; calyx with imbricate aestivation ..... **Bowkeria**

35b Corolla without pouches, pockets or spurs near base of corolla tube or limb:

48a Shrubs, or trees, or softly woody epiphytes:

49a Fruit fleshy and indehiscent:

50a Leaves opposite and decussate, fleshy; stamens 5, perfect, equal; epiphytic ..... **Dermatobotrys**

50b Leaves opposite, rarely decussate, or alternate, not fleshy; stamens 4 (rarely 5, or 5th one a staminode), didynamous or subequal; not epiphytic:

51a Ovules usually 4 per locule; flowers solitary ..... **Oftia**

51b Ovules many per locule; flowers in cymes or subfasciculate:

52a Calyx 3–5-cleft; style long, filiform ..... **Halleria**

52b Calyx 5-partite; style short, fleshy ..... **Teedia**

49b Fruit capsular, dehiscent or subindehiscent:

53a Anthers bithecate with thecae erect; if staminodes present, very short and rudimentary:

54a Leaves petiolate; stamens exserted; capsule valves entire ..... **Phygelius**

54b Leaves sessile to shortly-petiolate; stamens included or scarcely exserted; capsule valves bifid ... **Freylinia**

53b Anthers synthecate (becoming unithecate by confluence of 2 thecae) with thecae transverse; if staminode present, filament long:

55a Branchlets straight, rigid and often spinescent; leaves alternate; staminode 1; stamen filaments arising at base of corolla tube ..... **Antherothamnus**

55b Branchlets usually somewhat curved, not rigid or spinescent; leaves opposite and decussate; staminodes 0; stamen filaments arising in throat and lower down in corolla tube ..... **Manuleopsis**

48b Herbs or undershrubs:

56a Stamens 4, rarely 2; anthers synthecate; mainly dryland herbs or undershrubs: (56b after 72b)
57a Posterior filaments not decurrent down corolla tube:
58a Bract adnate halfway up calyx tube ..... **Glekia**
58b Bract or floral leaf not or scarcely adnate to calyx tube (at most adhering to part or all of pedicel and sometimes extreme base of calyx):
59a Posterior stamens included, arising halfway up tube or higher, anterior stamens either included or anthers just visible in mouth ..... **Manulea**
59b One or both pairs of stamens exserted at anthesis (caution: both pairs deeply included in 2 species of *Sutera*), arising near base of tube:
60a Inside of corolla tube either glabrous or with longitudinal bands of clavate hairs, these sometimes coalescing, sometimes extending from throat onto bases of corolla lobes; seeds patterned with transversely elongated pits arranged like a chequer board ..... **Sutera**
60b Clavate hairs, when present, confined to orange/yellow patch at base of posterior lip; seeds sinuously wrinkled in longitudinal bands ..... **Trieenea**
57b Posterior filaments decurrent down corolla tube, often to base, sometimes very briefly:
61a Stigma very short (up to 2 mm), often minutely bifid, stigmatic surface ± terminal, either jelly-like or composed of minute papillae, these either terminal or also extending very briefly downwards:
62a Leaves usually opposite, bases decurrent, forming ridges or narrow wings down stem ..... **Lyperia**
62b Leaves either alternate, at least on upper part of stem, or opposite and then not decurrent:
63a Corolla tube scarcely expanded at apex; anterior anthers shortly exserted; seeds with 6–8 longitudinal ribs, testa reticulate in furrows between ribs ..... **Camptoloma**
63b Corolla tube abruptly expanded at apex; at most tips of anterior anthers visible in mouth or very shortly exserted; seeds not ribbed, testa reticulate (2 species also with transversely elongated pits) ..... **Jamesbrittenia**
61b Stigma lingulate (tip occasionally minutely bifid), often ± equalling or longer than style, flattened, with 2 marginal bands of stigmatic papillae:
64a Bract either adnate to pedicel (or part of pedicel) only, or to pedicel and base of calyx tube (never more than lower third):
65a Inflorescence capitate, nodding in flower, erect in fruit ..... **Glumicalyx**
65b Inflorescence either capitate or extended, always erect:
66a Floral bracts roughly as long as broad, sharply differentiated from leaves ..... **Strobilopsis**
66b Floral bracts longer than broad, often leaf-like:
67a Capsule beaked; orange patches, if present on corolla limb, then located on all lobes forming radial pattern ..... **Zaluzianskya**
67b Capsule not beaked; orange/yellow patches present on corolla limb but only on posterior lip:
68a Corolla with an orange/yellow patch at base of posterior lip extending down back of tube; seeds pallid or greyish, sinuously wrinkled in longitudinal bands ..... **Trieenea**
68b Orange/yellow patch on corolla confined to posterior lip; seeds black, coarsely reticulate ..... **Melanospermum**
64b Bract adnate at least halfway up calyx tube, rarely less:
69a Ovules 2 in each locule, one pointing upwards, one downwards; inflorescence a corymb..... **Tetraselago**
69b Ovules at least 4 in each locule and never diametrically opposed; inflorescence a spike or raceme, sometimes condensed into a head, sometimes panicled:
70a Calyx strongly 5-ribbed, plicate in flower, distinctly bilabiate, posterior lip 3-toothed, anterior lip ± 2-toothed; stamens 4 or 2; staminodes usually absent; flowers ± sessile .... **Zaluzianskya**
70b Calyx not strongly ribbed, rarely plicate and then 2 stamens and 2 staminodes, distinctly bilabiate or not, lobing various, often deep, sometimes right to base; stamens 4 or 2; staminodes present or absent; flowers pedicellate:
71a Hairs on stems (and elsewhere) always patent, gland-tipped; testa translucent, loosely enveloping endosperm, seed 3-winged or 3-angled ..... **Polycarena**
71b Hairs on stems eglandular or mixed with glandular hairs, but some eglandular hairs always present, particularly near base of stem and there nearly always ± retrorse; patent eglandular hairs usually present on margins of bracts; testa ± opaque, tightly investing endosperm; seed never winged:
72a Calyx mostly lobed halfway or more to base; upper lip of corolla 2-lobed, lower 3-lobed ..... **Phyllopodium**
72b Calyx lobes much shorter than tube, one corolla lobe isolated, the other 4 closely associated ..... **Reyemia**
56b Stamens 4, or 2, anther thecae 2, distinct or confluent; mainly water plants or in a habitat of unusual moisture conditions:
73a Stamens 4, only somewhat didynamous, or only 2 (lower pair) perfect and other pair reduced to staminodes or absent:
74a Small, woody subshrubs; stems slightly ribbed but not winged ..... ***Scoparia**
74b Marsh or aquatic herbs; if stems present, broadly 4-winged:
75a Flowers sessile; stamens 2, anther thecae unequal; capsule unilocular ..... **Dintera**
75b Flowers stalked; stamens 4, anther thecae equal; capsule bilocular, at least in basal part ..... **Limosella**
73b Stamens 4, didynamous, or only upper pair perfect:

76a All stamens and staminodes arising in corolla tube; anterior pair without appendages:
77a Calyx tubular, 5-toothed; leaves entire or denticulate ..... **Mimulus**
77b Calyx 5-partite or deeply 5-lobed; rarely dentate and then aerial leaves pinnatisect to lacerate:
78a Capsule shortly beaked and reflexed at maturity ..... **Stemodiopsis**
78b Capsule neither beaked nor reflexed:
79a Calyx lobes distinctly unequal; anther thecae not stipitate (shortly stalked) ..... **Bacopa**
79b Calyx lobes ± equal (or posterior lobes somewhat larger); anther thecae usually stipitate:
80a Stamens 4 (2 in cleistogamous flowers); style bent at right angles; leaves not crowded towards base of stem ..... **Limnophila**
80b Stamens 2; style straight; leaves crowded towards base of stem ..... **Dopatrium**
76b All stamens and staminodes arising at top of corolla tube or in throat, anterior ones usually with appendages at base, rarely simple (*Lindernia conferta*):
81a Basal leaves bifurcate through incomplete lateral fusion; flowers subtended by 2 decussate pairs of floating bracts/leaves; aquatic plants ..... **Chamaegigas**
81b Leaves and flowers not as above; plants aquatic or terrestrial:
82a Leaf venation pinnate; seeds with thickening of some epidermis cell walls; ovary with hairs at apex and ovary locules with unicellular hairs inside ..... **Torenia**
82b Leaf venation palmate (some *Lindernia* species have narrow leaves and venation is obscure); seeds with thin-walled epidermis; ovary and ovary locules not as above:
83a Nectary present; stamens usually 2 plus 2 staminodes, rarely 4 fertile ..... **Lindernia**
83b Nectary absent; stamens 4 fertile:
84a Corolla lower lip with hairs having a multicellular base and club-shaped end cell; endosperm alveolate and aulacospermous (furrowed/ribbed); plants nonrosulate; roots whitish ..... **Crepidorhopalon**
84b Corolla lower lip without such hairs; endosperm alveolate and bothrospermous (not furrowed/ribbed); plants rosulate; roots often red, orange or yellow ..... **Craterostigma**

Alectra Thunb. 7597010

Thunberg: 81 (1784); Bentham: 966 (1876); Hemsley & Skan: 362 (1906); Melchior: 423 (1941); Hepper: 405 (1960); Henderson & Anderson: 288 (1966); Merxmüller & Roessler: 5 (1967a); Visser: 82, 156, tt. 129–147 (1981); Hilliard & Burtt: 371 (1986b); Philcox: 85 (1990); Fischer: 45 (1996); Mielcarek: 85 (1996).

Melasma P.J.Bergius in part, Hiern: 371 (1904).

Annual or perennial herbs, hemiparasitic on roots, turning dark in drying; stems ± erect, simple or branched, usually hispid. **Leaves** opposite or alternate, sessile to shortly petiolate, variously ovate, lanceolate or linear, entire or toothed, sometimes scale-like or aborted. **Flowers** solitary in axils of leaves or bracts, sessile to shortly pedicellate, bibracteolate, usually densely subspicate, yellow or orange with darker veins. **Bracts** leaflike; bracteoles 2, close under calyx. **Calyx** campanulate, 5-lobed to ± halfway, 10-veined or -ribbed, not accrescent in fruit; lobes subequal. **Corolla** tubular, subregular, 5-lobed to ± halfway, thin, longer than calyx, early marcescent (withering) but persistent within calyx around capsule; tube often with globose base, then narrowly campanulate, slightly oblique; lobes subequal, rounded, recurved or later twisted up, posterior lobes interior. **Stamens** 4(5), didynamous, at times subequal, arising about middle or near base of corolla tube, included; filaments linear, sometimes curved and/or bearded in various parts; anthers bithecate, coherent or connivent in pairs, thecae equal or unequal, apiculate or not; staminodes 0. **Ovary** bilocular, compressed, orbicular or ovoid, glabrous; ovules many on thick, axile placentas; style linear; stigma broader, recurved, rarely flat and membranous, included. **Fruit** a globose to broadly ovoid or compressed, loculicidal capsule, included within calyx. **Seeds** very many, linear or clavate, straight or curved, slender, truncate; testa transparent, membranous, reticulate, open at either end.

Species ± 40, Asia, tropical and sthn Afr.; ± 17 in sthn Afr., widespread.

Alonsoa Ruiz & Pav. 7469000

Ruiz & Pavón: 150 (1798); Wettstein: 53 (1891/1893); Hiern: 138 (1904); Hilliard & Burtt: 338 (1984); Roux: 7 (1986); Steiner: 1152 (1989); Steiner: 63 (1996).

Schistanthe Kunze: 109 (1842); Bentham: 249 (1846); Wettstein: 53 (1891/1893).

Annual or perennial herbs, simple or branched, sometimes tufted; stems quadrangular, glabrous to glandular-villous or hirsute. **Leaves** mostly opposite, sometimes alternate near inflorescence, petiolate, lanceolate to ovate, entire or dentate to pinnatifid, apex acute. **Flowers** 1–several in lax terminal racemes, alternate, resupinate by twisting of pedicels. **Bracts** leafy or bractiform, ovate to linear. **Calyx** 5-lobed; segments lanceolate or narrowly elliptical, somewhat unequal, entire or irregularly incised, imbricate at base in bud. **Corolla** expanded, bilabiate, unequally 5-lobed, tube very short, split to base on anterior side (morphologically posterior side); limb spreading; upper lip (actually lower one) 3-lobed, central one largest, broadly ovate, lateral ones ovate or broadly so, gamopetalous portion at base of lateral lobes with 2 shallow sacs lined with oil-secreting hairs; lower lip (actually upper one) split centrally to base, of 2 broad lobes, exterior in bud. **Stamens** 4, all perfect, didynamous; filaments short, basally declinate, not twisted round each other, glabrous, or glandular-puberulent; anthers shortly oblong, unithecate by confluence; staminodes 0. **Ovary** bilocular, ovate or widely ovate, obtuse or emarginate; ovules many; style involute, subulate, persistent; stigma capitate or minutely bifid. **Fruit** an ovate or pyriform, emarginate, septicidally bivalved capsule; valves entire, emarginate or bifid. **Seeds** many, small, ovoid or oblong to elliptic, wingless, a little depressed at both ends, dark brown with shallow longitudinal grooves, punctate-rugose or papillate. $x = 7$, 12, 25 (1 report each, aneuploids, polyploidy).

Species 16, mainly South American, ranging from Mexico to Chile, centred in Peru; 2 in sthn Afr.: *Alonsoa peduncularis* (Kunze) Wettst., Western and Eastern Cape (restricted to Rooiberg, Touwsberg and near Uitenhage), and *A. unilabiata* (L.f.) Steud. from Western Cape, but probably extinct near Cape Town. South African species of *Alonsoa*

differ from South American ones in having 2 shallow, trichome-lined sacs on corolla. Oil-collecting bees act as pollinators.

Anastrabe E.Mey. ex Benth. 7499000

Bentham: 54 (1836c); Hiern: 217 (1904); Hilliard: 4 (1969).

Shrubs or small trees, with stellate hairs on many parts. **Leaves** opposite or subopposite, lanceolate or oblong, entire or serrate, leathery. **Flowers** in axillary and terminal, many-flowered cymes; secreting oil for pollinators. **Bracts** in pairs at each branching of inflorescence and subtending pedicels. **Calyx** 5-lobed; lobes valvate, ± as long as tube, posterior one slightly larger. **Corolla** bilabiate; tube much inflated on anterior side, narrow above, base ± cylindrical, lower lip inflated, forming a deep pouch; lips longer than tube, ciliate and glandular on outer surface; posterior lip erect, deeply 2-lobed, exterior in bud; anterior lip pouch-shaped, shortly trifid; mouth open. **Stamens** 4, didynamous, ascending, included; filaments arising at top of narrow, basal part of corolla tube, much thickened at base where they embrace top of ovary; anterior pair twisted at base, bringing anthers to face front of flower above those of posterior pair; anthers bithecate, thecae divergent, confluent at maturity; staminode 1. **Ovary** bilocular, conical, tomentose; placenta T-shaped in cross section, whole surface ovuliferous; ovules many; style long, slender, semiterete, included, persistent; stigma simple. **Fruit** a woody, ovoid, septicidal capsule, surrounded by calyx. **Seeds** many, fusiform; testa deeply reticulate. $x = 20$ (1 report).

Monotypic: *Anastrabe integerrima* E.Mey. ex Benth., Mozambique and sthn Afr., KwaZulu-Natal and Eastern Cape to ± East London; coastal districts.

Antherothamnus N.E.Br. 7497010

Brown: t. 3007 (1915); Verdoorn & Schweickerdt: 447 (1937); Merxmüller & Roessler: 8 (1967a); Philcox: 20 (1990); Hilliard: 75 (1994).

Selaginastrum Schinz & Thell.: 119 (1929); Verdoorn & Schweickerdt: 447 (1937).

Foetid shrubs; branches, straight, rigid, subspinescent with age, shallowly ribbed by decurrent leaf bases when young, glandular-pubescent, glabrescent. **Leaves** alternate, fascicled on young wood, obovate, cuneate, obtuse, entire to toothed, base of petiole persistent. **Flowers** pedicellate and bibracteolate, grouped in miniature thyrses arising from leaf fascicles on ultimately spinescent branchlets, overtopping leaves. **Bracts** free from pedicel and calyx. **Calyx** obscurely bilabiate, 5-lobed nearly to base, ± glabrous. **Corolla** bilabiate, 5-lobed; tube funnel-shaped, mouth ± round; lobes spreading, suborbicular, glabrous outside, inside with clavate unicellular or bicellular hairs in sinuses, otherwise glabrous; 2 posterior lobes outside in bud. **Stamens** 4, didynamous; filaments arising near base of tube, decurrent; posterior pair somewhat hairy, included; anterior ones glabrous, shortly exserted, exceeding posterior pair; anthers synthecate, thecae ± transverse; staminode 1, long. **Nectary** not conspicuous, possibly very shallowly annular. **Ovary** bilocular, deltoid, glabrous; ovules ± 6–12 per locule; stigma very minutely bifid, arms not separating, terminally papillose, very shortly exserted. **Fruit** a septicidal capsule, each valve with a short loculicidal split; placenta with ± clavate, unicellular hairs. **Seeds** ± ellipsoid, brown; testa thin, reticulate.

Monotypic: *Antherothamnus pearsonii* N.E.Br., SW Zimbabwe; S Namibia and Botswana, Northern Province, North-West and Northern Cape.

Anticharis Endl. 7466000

Endlicher: 22 (1839); Hiern: 136 (1904); Hemsley & Skan: 275 (1906); Merxmüller & Roessler: 9 (1967a); Philcox: 7 (1990).

Herbs or small undershrubs, erect or suberect, glandular-pubescent. **Leaves** alternate, linear to ovate, entire, bases often attenuate. **Flowers** solitary, axillary, pedicellate, often bibracteolate. **Calyx** 5-lobed; lobes narrowly lanceolate. **Corolla** 5-lobed; tube much longer than calyx, funnel-shaped; lobes flat, spreading, subequal, shorter than tube, upper lobes external in bud. **Stamens** 2, anterior, included; filaments filiform, arising above base of corolla tube; anthers transverse, glabrous or hairy, with the thecae confluent; staminodes 0. **Nectary** annular. **Ovary** bilocular; ovules many; style filiform, subclavate. **Fruit** a capsule, ovoid or cylindrical, subacuminate, loculicidal and septicidal; valves bend marginally inwards on dehiscence, exposing placentiferous column. **Seeds** small, many, ovoid or cylindrical, striate, rugose or not.

Species ± 10, mostly Africa, extending to Arabian Peninsula and India; 6 in sthn Afr., mostly Namibia, also Botswana, Northern Province (Messina) and Northern Cape (Kalahari Gemsbok Park and Richtersveld).

Aptosimum Burch. ex Benth. 7467000

Bentham: t. 1882 (1836d) name conserved; Hiern: 125 (1904); Hemsley & Skan: 267 (1906); Weber: 1, 99 & tt. 1–3 (1907); Merxmüller & Roessler: 12 (1967a); Codd: 80 (1982); Philcox: 3 (1990).

Chilostigma Hochst.: 372 (1841a). *Ohlendorffia* Lehm.: 7 (1835).

Perennial undershrubs but sometimes flowering in herbaceous state, low, with or without elongated and often procumbent branches, sometimes cushion-forming or tufted, mostly woody at base. **Leaves** alternate, usually densely crowded on long or short shoots, linear, lanceolate, elongated or spathulate, entire, 1-nerved, midrib sometimes persistent and spinescent. **Flowers** solitary in leaf axils or in short axillary cymes, sessile or subsessile, bibracteolate, dark blue to violet. **Calyx** tubular, 5-lobed to various depths; tube campanulate; lobes linear to deltoid or ovate, ± valvate in bud. **Corolla** tubular, slightly irregular, 5-lobed; tube elongated, much longer than calyx, widening suddenly above short, narrow base into a long throat, mouth wide; limb patent, much shorter than tube, oblique; lobes free, rounded, ± equal, 2 posterior outside in bud. **Stamens** 4, didynamous, included, arising in lower part of corolla tube; filaments filiform; anthers of shorter, posterior pair smaller than those of longer, anterior pair and sometimes sterile, anthers bithecate, transverse, ciliate-hispid; thecae confluent so dehiscing along a single transverse line. **Nectary** usually saucer-shaped. **Ovary** bilocular; ovules many; style filiform, exceeding stamens; stigma small, obscurely bidentate, emarginate or subcapitate. **Fruit** a thick-walled capsule, obovoid, ± globose, broadly ovoid or ovoid, upper part compressed at right angles to septum, emarginate, septicidal but opening only at top, often persistent; valves usually bifid. **Seeds** many, obovoid or flattened-globose; testa adpressedly reticulate.

Native to sthn and tropical Africa, species ± 40; ± 19 in sthn Afr., widespread but mostly in western, dry regions; not in Swaziland, KwaZulu-Natal or Lesotho. See note under *Peliostomum*.

Bacopa Aubl. 7546000

Aublet: 128, t. 49 (1775) name conserved; Hepper: 358 (1963); Philcox: 48 (1990); Greuter *et al.*: 298 (1994); Mielcarek: 33 (1996).

Moniera P.Browne: 269 (1756); Hiern: 355 (1904).

Annual herbs, erect, prostrate, decumbent or ascending, or floating, mostly glabrous, sometimes pubescent or subglabrous, often glandular-punctate; stems simple or

branching, often rooting at nodes. **Leaves** opposite, petiolate to sessile, variously obovate to spathulate or linear to lanceolate or ovate, entire or variously dentate to crenate, or leaves capillary-divided in aquatic species; often glandular punctate. **Flowers** axillary, usually solitary, sometimes several, pedicellate, usually bibracteolate just below calyx. **Calyx** 5-partite; sepals imbricate in bud, unequal, posterior broadest, laterals usually very narrow. **Corolla** bilabiate; tube cylindrical; upper lip emarginate or 2-lobed, exterior in bud; lower lip 3-lobed; lobes equal or subequal. **Stamens** 4, didynamous, perfect, included, arising in corolla tube; anthers bithecate; thecae usually parallel, sometimes divaricate or finally confluent; staminodes 0. **Nectary** 0 or 1. **Ovary** bilocular; ovules many; style dilated at apex, entire, concave or 2-lobed. **Fruit** an ovoid to globose or ellipsoid capsule, loculicidal or septicidal, bivalved; valves bifid or bipartite. **Seeds** small, many, usually striate and transversely reticulate. $x = 8$ (1 report, polyploidy).

Species ± 56, tropical and subtropical regions; 3 in sthn Afr., Botswana, Northern Province, Mpumalanga and KwaZulu-Natal; marsh plants, at times aquatic.

Bartsia L. 7645000

Linnaeus: 602 (1753) name conserved; Bentham: 977 (1876); Hemsley & Skan: 458 (1906); Visser: 82, 164, figs 210–214 (1981); Greuter *et al.*: 230 (1994).

Bellardia All.: 61 (1785); Hiern: 419 (1904).

Annual, viscid-pubescent herbs, parasitic on grass roots; stems simple or slightly branched in inflorescence, erect, leafy. **Leaves** opposite, sessile or lowest shortly petiolate, narrow-lanceolate, obtuse, coarsely toothed or shallowly pinnatifid, spreading. **Flowers** sessile, in axils of leaves or bracts, in dense terminal spikes, usually unbranched, elongated in fruit. **Bracts** almost as long as flowers. **Calyx** ovoid, somewhat inflated, tetragonous, shortly 4-lobed, densely tomentose; tube campanulate; lobes deltoid, obtuse or rounded. **Corolla** tubular, bilabiate, almost personate, 4-lobed; tube subcylindrical, ± as long as calyx tube, slightly curved; upper lip erect, narrow, hooded, concave, entire, rather shorter than lower one, inside in bud; lower lip dilated, spreading, 3-lobed, middle lobe the smallest; palate bigibbous, prominent. **Stamens** 4, all fertile, didynamous, slightly exserted; upper pair arising at base of upper corolla lip, lower pair in lower part of corolla tube; all lying in hollow of upper lip; filaments filiform; anthers free, pendulous, bithecate; thecae oblong, shortly mucronulate at base, equal, parallel, ± bearded or at length glabrous. **Ovary** bilocular, ovoid, hirsute; ovules many, on thick, bifid placentas; style linear, exceeding stamens, ± exserted, curved downwards near apex, hairy; stigma short, somewhat thickened, clavate, bifid. **Fruit** a somewhat flattened, ovoid capsule, coriaceous, pubescent, turgid, loculicidal, bisulcate and enclosed in calyx. **Seeds** many, small, convex on one side, flattish on other, longitudinally ribbed; testa membranous. $x = 6$ (7) (aneuploids, high polyploidy).

Species 49, mostly South America (Andes), also S Europe, Orient, North America and Africa; 1 in sthn Afr.: *Bartsia trixago* L., sporadic in Northern, Western and Eastern Cape; possibly introduced.

Bowkeria Harv. 7500000

Harvey: t. 37 (1859); Hiern: 218 (1904); Hilliard: 7 (1969).

Shrubs or sometimes small trees up to ± 4 m high, aromatic, with sessile glands on several parts, and hairs, if present, simple, sometimes gland-tipped. **Leaves** usually ternate, sometimes opposite, lanceolate, elliptic or ovate, usually pubescent. **Flowers** bracteate, pedicellate, bibracteolate, in 1–many-flowered cymes, solitary in axils of upper leaves; secreting nonvolatile oil for pollinators. **Bracts** paired at each inflorescence branching and subtending pedicels. **Calyx** 5-lobed, divided almost to base; lobes imbricate, posterior segment usually largest. **Corolla** bilabiate, 5-lobed; tube short, strongly pouched on anterior side; mouth slit-like, lips pressed together or slightly open; limb oblique, upper lip erect, 2-lobed, exterior in bud; lower lip 3-lobed. **Stamens** 4, didynamous, ascending, usually included; filaments arising at top of short, narrow, cylindrical base of corolla tube, swollen bases embracing top of ovary, rather thick; anterior pair basally twisted so all anthers face outwards; anthers bithecate; thecae divergent, confluent at maturity; staminode 1. **Ovary** bi- or sometimes trilocular, cylindrical or conical, glandular; placenta T-shaped in cross section, whole surface ovuliferous; ovules many; style long, slender, persistent; stigma small. **Fruit** a woody, ovoid, septicidal capsule, surrounded by calyx. **Seeds** many, fusiform; testa deeply reticulate. $x = 20$ (1 report).

Species 3, sthn Afr., mostly eastern half, Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho and Eastern Cape, from ± Woodbush, along Drakensberg to Hogsback; montane, usually near streams and on forest margins.

Buchnera L. 7622000

Linnaeus: 630 (1753); Linnaeus: 278 (1754); Hiern: 391 (1904); Hemsley & Skan: 373 (1906); Merxmüller & Roessler: 20 (1967a); Visser: 82, 158, tt. 156–159 (1981); Philcox: 96 (1990); Mielcarek: 96 (1996).

Annual or perennial, often hemiparasitic herbs, usually somewhat rigid and scabrid, turning dark on drying; stems erect, ascending or prostrate, simple or branched, glabrous to hispid-scabrid. **Leaves** usually opposite or quasiverticillate, sometimes subopposite or alternate above, sessile to shortly petiolate, 1–5-veined, lowest ones usually obovate, entire or dentate, upper ones narrow, entire or denticulate, gradually passing into bracts. **Flowers** often small, sessile or subsessile in axils of upper leaves or bracts, usually bibracteolate, solitary, in terminal, compact to lax spikes or in terminal, or axillary, ± globose clusters; inflorescences often lengthen in fruit. **Calyx** tubular, 4- or 5-toothed, tube cylindrical, narrow, 5- or 10(7 or 8)-veined or -ribbed; teeth short, deltoid to lanceolate-acuminate, usually scabrid on margin. **Corolla** tubular, 4- or 5(6)-lobed, slightly irregular; tube slender cylindrical, longer than calyx, straight or gently curved, glabrous to softly pilose, throat sometimes densely pilose; limb shorter than tube, spreading; lobes subequal, obovate to subcircular or oblong, entire or emarginate, 2 posterior ones often a little smaller, interior in bud. **Stamens** 4, slightly didynamous, subequal, arising about middle of corolla tube, subsessile or with short filaments, included; anthers unithecate, erect, dorsifixed, acute, blunt at base. **Ovary** bilocular, elliptical; ovules many per locule; style terete, straight; stigma thickened or clavate, entire or emarginate, almost as long as style, included. **Fruit** an ovoid to oblong, loculicidal capsule. **Seeds** many, obovoid or oblong; testa membranous, reticulate, tightly investing endosperm. $x = 10$ (polyploidy).

Species ± 100, mostly Old World tropics and subtropics; ± 9 in sthn Afr., in all areas except Northern Cape but mostly in north and northeast.

Buttonia McKen ex Benth. 7611000

Bentham: 63, t. 1080 (1871); Hiern: 384 (1904); Hemsley & Skan: 439 (1906); Hennessy: t. 1815 (1980); Visser: 82, 157, tt. 148–152 (1981); Philcox: 141 (1990).

Perennial, slender, trailing or scrambling shrubs, hemiparasitic on roots; stems flexible, much branched,

somewhat woody. **Leaves** opposite, petiolate, ± ovate in outline, dentate to pinnatifid or pinnatisect, coriaceous. **Flowers** solitary, axillary, pedicellate, bracteate and bibracteolate. **Bracts** small, deciduous; bracteoles opposite, subsessile just below calyx, deciduous. **Calyx** tubular, (4)5-lobed, somewhat leathery, inflated in fruit; tube ± campanulate or urceolate, 10-veined; lobes ovate, spreading, shorter than tube. **Corolla** tubular, 5-lobed, slightly irregular; tube narrow at base, inflated and ± funnel-shaped above, somewhat curved, with wide throat; limb spreading; lobes rounded, shorter than tube, subequal but posterior pair smallest, interior in bud. **Stamens** 4, didynamous, included, glabrous; upper pair arising in lower part of expanded portion of corolla tube; lower pair arising lower down, in upper part of narrow portion of tube; filaments linear; anthers connivent in pairs, bithecate or unithecate by abortion: upper stamens with one theca empty and vermiform, lower stamens with empty theca absent; staminodes 0. **Ovary** bilocular, globose, glabrous; ovules many per locule; style filiform, curved above, exserted; stigma obscurely 2-lobed. **Fruit** a globose, glabrous, loculicidal capsule, enclosed in enlarged, persistent calyx. **Seeds** many, conical-cylindrical, truncate at both ends; testa reticulate.

Species 3, tropical and sthn Afr.; 2 in sthn Afr.: *Buttonia natalensis* McKen ex Benth. and *B. superba* Oberm., Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal.

Camptoloma Benth. 7591000

Bentham: 430 (1846); Bentham: 960 (1876); Hilliard: 80 (1994).

Urbania Vatke: 10 (1875). *Sutera* Roth in part, Merxmüller & Roessler: 50 (1967a).

Perennial shrublets or herbs, flowering sometimes as seedlings; stems brittle, leafy, very glandular-pubescent, sometimes woody. **Leaves** mostly alternate, opposite only at extreme base of seedlings, petiolate, broadly ovate, serrate. **Flowers** pedicellate, sometimes bracteate and 1- or 2-bracteolate, in axils of upper leaves, solitary, paired or in cymules with up to 11 flowers, forming leafy racemes or narrow panicles. **Bracts**, if present, very small, free from pedicels. **Calyx** 5-lobed nearly to base, hardly bilabiate; lobes elliptic-spathulate. **Corolla** slightly irregular, 5-lobed; tube cylindrical, scarcely expanded at apex, glabrous outside, throat bearded inside with broad band of clavate hairs; upper lip 2-lobed with lobes joined for ± half their length, exterior in bud; lower lip 3-lobed. **Stamens** 4, didynamous; posterior pair arising ± halfway up tube, included, with filaments decurrent to tube base, forming channel for style; anterior pair arising in throat, very shortly exserted; all filaments bearded with long clavate hairs or not, minutely glandular at apex; anthers synthecate, dorsifixed, anterior ones often slightly larger than posterior; staminodes 0. **Nectary** ill-defined at base of ovary, but probably annular, either convoluted or swollen on one side. **Ovary** bilocular, cuneate, tapering into style, glabrous; ovules many per locule; stigma very short, held in throat or very shortly exserted; stigmatic papillae in a lateral groove carried over apex, tip sometimes very shortly bifid. **Fruit** a sharply beaked, septicidal capsule, tip of each valve with a short loculicidal split. **Seeds** very small, red-brown, oblong, with 6–8 longitudinal ribs (aulacospermous); testa reticulate in furrows between ribs.

Species 3, Canary Islands, South Yemen, Socotra, Kuria Muria Islands (Oman), Somalia and western deserts of Angola; 1 in sthn Afr.: *Camptoloma rotundifolium* Benth., Namibia, in northern half, as far south as Naukluft Mountains.

Chamaegigas Dinter 7564010

Dinter: 38 (1916) (descr.); Dinter: 123, 168 (1921) (descr.); Dinter: 7 (1923) (nomen); Heil: 41 (1925); Merxmüller & Roessler: 21 (1967a); Fischer: 22, 328 (1992).

Lindernia All. in part, Obermeyer: t. 1503 (1967); Giess: 23 (1969).

Small, perennial, aquatic herbs; main stem a compressed rhizome. **Leaves** possibly heteromorphic; basal leaves submerged, in dense tuft or rosette, bifurcate through lateral fusion of basal part of 2 leaves, each lobe linear-subulate, falcate, fleshy, glabrous; upper floating leaves, or bracts, in 2 decussate, adjacent, unequal pairs, obovate or lanceolate, obtuse, glandular-punctate, subtended by filiform stalk arising from single bud in axil of double basal leaf. **Flowers** 1 or 2(3), exserted above floating leaves on short pedicels, recurving in fruit. **Calyx** 5-lobed, cup-shaped; lobes triangular, obtuse, subequal, shorter than tube. **Corolla** bilabiate; tube ± equal to or shorter than upper lip, funnel-shaped with glandular hairs inside; upper lip hooded with upper edge recurved, emarginate, exterior in bud; lower lip much longer, 3-lobed, central lobe larger and apex square, lateral lobes spreading, smaller. **Stamens** 4, didynamous, arising in corolla throat but ± decurrent; posterior pair short, erect, arched above, included in hood, with anthers cohering; anterior pair with filaments geniculate and expanded at base, there covered with stalked glands, filaments free above, bent up and inwards, forming arch; anthers cohering close to posterior pair; anthers bithecate, thecae divergent; staminodes 0. **Nectary** 3-lobed, below ovary, on anterior side. **Ovary** bilocular, ovoid; ovules ± 20 per locule on swollen axile placenta; style appressed to dorsal side of tube and upper lip, arched downwards so stigma exserted in front of stamens; stigma with 2 broad, obtuse, papillate lobes. **Fruit** a bilocular capsule, ovoid when immature. **Seeds** elongate-elliptic, 12-sided, faces ribbed; endosperm not alveolate.

Monotypic: *Chamaegigas intrepidus* Dinter, Namibia, from Otjiwarongo south to Rehoboth District; in ephemeral rock pools; remarkably able to resurrect after long drought and flower within few days.

Charadrophila Marloth 7893000

Marloth: 358, t. 8 (1899); Hiern: 370 (1904); Weber: 87 (1989).

Small, delicate herbs to ± 0.15 m in height, ± whole plant softly pilose; stem short, mostly unbranched. **Leaves** opposite and decussate, in a loose rosette, petiolate, broadly elliptic, crenate, pubescent. **Flowers** axillary, single, bracteate, long-pedicellate, in a terminal, sometimes lateral raceme (appearing cymose as the uppermost, fully developed flower overtops the arrested or rudimentary apex and looks like part of main axis. **Bracts**: lower ones opposite, upper ones alternate; bracteoles 2, opposite, ± halfway up pedicel. **Calyx** tubular, 5-lobed, shorter than corolla tube, ± radial at first, then clearly bilabiate; tube shallowly campanulate; lobes subequal, ovate-oblong, equal to or longer than tube. **Corolla** bilabiate, tubular, pale blue; tube short, broad, subcampanulate, somewhat pouched on posterior side, white within, throat bearded on upper side; posterior lip 2-lobed, one lobe exterior, rarely partly so, other interior in bud; anterior lip 3-lobed, usually middle one outside; all lobes broad, obovate, spreading, subequal. **Stamens** 4(5), subequal, arising a little above base of corolla tube, included; filaments terete, rather short, curved, glabrous; anthers bithecate, thecae diverging or nearly parallel, each theca with 2 pollen sacs becoming confluent at maturity, dehiscing longitudinally by slit between sacs; staminode 1 or 0. **Ovary** bilocular, ovoid, villous; ovules

many on axile, mushroom-shaped placenta; style linear, scarcely exserted, entire, persistent; stigma slightly 2-lobed. **Fruit** an ovoid, somewhat compressed, laterally grooved, apiculate or acuminate capsule, loculicidal and partly septicidal; after anthesis pedicels becoming strongly recurved. **Seeds** many, broadly elliptical, longitudinally furrowed (aulacospermous), apex obtuse, sometimes mucronate, base with pointed appendix; testa black, reticulate. $x = 10$ (1 report).

Monotypic: *Charadrophila capensis* Marloth; Western Cape, rare in small moist gorges near Stellenbosch and on Hangklip Peninsula. Due to its habit which resembles that of members of Gesneriaceae, formerly sometimes considered to belong to that family [e.g. Engler in Marloth (1899)].

Chenopodiopsis Hilliard 7568050

Hilliard: 315 (1990); Hilliard: 1 (1999).

Selago L. in part, Rolfe: 162 (1901).

Small annual herbs; stems erect, decumbent or ascending; brachyblasts 0; hairs on stems, leaves, bracts and calyx thin-walled. **Leaves** opposite, bases often connate, sometimes becoming alternate upwards, variously shaped, sometimes tapering into petiole. **Flowers** sessile, in a narrow spike, or several forming a panicle. **Bract** adnate to part of calyx tube. **Calyx** 5-lobed or 5-toothed, campanulate; anterior lip sometimes only very shallowly divided. **Corolla** tubular, uni- or bilabiate, 4- or 5-lobed; tube cylindrical or funnel-shaped; posterior lip 4-lobed, sometimes bearded with minute clavate hairs, without yellow/orange patch, exterior in bud; anterior lip 1-lobed, minute, or lobe wanting. **Stamens** 4, didynamous, sometimes 2 being somewhat abnormal, or 2 only (anterior pair); filaments arising in upper part of corolla tube or in mouth, shortly decurrent on tube; anthers synthecate, dorsifixed, ± exserted. **Nectary** annular but more strongly developed on one side. **Ovary** bilocular, elliptic-oblong, base oblique; ovule 1 per locule, pendulous; style filiform; stigma lingulate with 2 marginal bands of stigmatic papillae, malformed when flowers autogamous. **Fruit** a pair of hard-walled cocci, convex on outer face with median longitudinal groove, rugose on either side of groove, ± plane on inner face, indehiscent. **Seeds** ± fusiform, smooth or transversely rugose.

Species 3, confined to sthn Afr., Northern Cape (Namaqualand) and Western Cape.

Colpias E.Mey. ex Benth. 7475000

Bentham: 53 (1836c); Hiern: 168 (1904); Steiner: 63 (1996).

Shrublet, much branched; branchlets softly pilose, subherbaceous, leafy. **Leaves** alternate and scarcely opposite, ovate- or rotund-deltoid, dentate or incised, petiolate. **Flowers** solitary, axillary, pedicellate, ebracteate, yellow, sometimes white or cream. **Calyx** 5-lobed almost to base, villous; segments somewhat unequal, lanceolate to elliptic, slightly imbricate. **Corolla** campanulate, 5-lobed; tube of medium length, broad, somewhat declinate at base, slightly incurved and ascending, nearly erect, with 2 gibbosities or short pouches in front, lined with oil-secreting trichomes; lobes broad, spreading, nearly equal, shorter than tube; upper 2 exterior in bud. **Stamens** 4, didynamous, declinate; filaments arising at base of corolla tube, short, thick, terete, incurved, glandular; anthers at length unithecate by confluence of 2 diverging thecae; staminode 1. **Ovary** ovoid, bilocular; ovules many; style short, thick, terete; stigma truncate or emarginate, thinly stigmatose. **Fruit** an ovoid, acuminate, bilocular, septicidal capsule; valves 2, coriaceous, bifid. **Seeds** many, black, oblong, furrowed, oblique at one end, with white aril at the other; testa adpressed, granular-rugose. $x = 10$ (1 report, polyploidy).

Monotypic: *Colpias mollis* E.Mey. ex Benth., Northern Cape (Richtersveld to Calvinia); in rock crevices in sheltered kloofs. Pollinated by oil-collecting bees.

Craterostigma Hochst. 7560000

Hochstetter: 668 (1841b); Hiern: 360 (1904); Hepper: 53 (1990); Fischer: 85 (1992).

Small, perennial herbs; roots sometimes with red, yellow or orange pigments; stem a short rhizome. **Leaves** rosulate, petiolate or sessile, obovate, spathulate or broadly ovate to lanceolate, mostly entire and ± glabrous above, pubescent beneath; venation palmate. **Flowers** pedicellate, axillary, either in short racemes, usually pedunculate, sometimes branched, sometimes arising from centre of rosette on a ± sessile inflorescence, or rarely flowers solitary. **Bracts** usually opposite, lanceolate, oblong or oval. **Calyx** tubular, 5-toothed, accrescent; tube campanulate or turbinate, sometimes plicate; lobes subequal, pubescent mainly on veins or ± pilose, shorter than tube. **Corolla** bilabiate, 4- or 5-lobed; tube funnel-shaped, pubescent within throat; posterior lip hooded, entire or shortly bilobed, exterior in bud; anterior lip 3-lobed, longer than posterior. **Stamens** 4, didynamous; upper pair included under hood, with filaments short, straight, arising at top of corolla tube; lower pair with filaments longer, arising ± in throat, geniculate and with yellow appendage at base, bent forwards and inwards above; anthers bithecate, approximating or cohering in pairs; thecae divaricate; staminodes 0. **Nectary** 0. **Ovary** bilocular, ellipsoid or elliptical; ovules many; style filiform, ± exserted, persistent; stigma capitate, of 2 membranous lobes, papillose, touch-sensitive. **Fruit** an ovoid or ellipsoid, septicidal capsule. **Seeds** globose; testa thin, brown, reticulate and punctate, epidermal cells thin-walled; endosperm alveolate and bothrospermous (with small hollows and nonfurrowed).

Species ± 9; Arabian Peninsula, Socotra, India, Madagascar, tropical and sthn Afr.; ± 4 in sthn Afr., widespread, mainly in northeastern parts, Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Free State, KwaZulu-Natal, Eastern Cape (Mkambati); usually in seasonally wet soils over rock, remaining dormant in dry season.

Crepidorhopalon Eb.Fisch. 7560010

Fischer: 439 (1989); Fischer: 126 (1992); Seine *et al.*: 7 (1995); Mabberley: 191 (1997).

Torenia L. in part, Hiern: 362 (1904); Merxmüller & Roessler: 56 (1967a); Philcox: 59 (1990); Brummitt: 117 (1992). *Lindernia* All. in part, Young: 9 (1952).

Small annual herbs; roots whitish; stems erect or ascending, sparingly branched, ± glabrous, quadrangular, ribbed to almost 4-winged because of decurrent leaf bases. **Leaves** opposite and decussate, mostly sessile, lowermost sometimes shortly petiolate, broad-based; lower ones ± equal, ovate to linear-lanceolate, entire to remotely serrulate, 1–3-veined with veins arising from base; upper pairs smaller, often very unequal. **Flowers** 1 per node, shortly pedicellate, bracteate, lower ones axillary, upper ones in lax to spike-like, few-flowered, terminal racemes. **Bracts** in unequal pairs, one ± leaf-like, other smaller, ± subulate. **Calyx** 5-lobed and 5-ribbed or winged; tube cylindrical to bilabiate; lobes ± as long as tube or much shorter. **Corolla** bilabiate; tube cylindrical; limb with upper lip shortly 2-lobed, somewhat hooded, exterior in bud; lower one larger, 3-lobed, with palate area at base bearing clavate hairs with multicellular bases. **Stamens** 4; posterior pair arising at top of corolla

tube, included, with filaments short, filiform; anterior pair arising in throat of tube, with filaments geniculate at base (sometimes obscurely so), with a small lateral appendage, then arched and connivent under upper lip; anthers usually cohering in pairs, bithecate; thecae divaricate; staminodes 0. **Nectary** 0. **Ovary** bilocular, elliptical; ovules many; style filiform; stigma bilamellate with papillate receptive area on inner sides. **Fruit** an oblong capsule, ± acute, somewhat shorter than calyx, septicidal, glabrous. **Seeds** small, many; testa reticulate, epidermal cells thin-walled; endosperm alveolate and longitudinally furrowed.

Species ± 24, tropical and sthn Afr.; 2 in sthn Afr.: *Crepidorhopalon debilis* (Skan) Eb.Fisch. and *C. spicatus* (Engl.) Eb.Fisch., NE Namibia, Botswana, Northern Province and Gauteng; usually in ephemeral flush communities. This genus was regarded as synonymous with *Torenia* L. by Brummitt (1992), but Mabberley (1997) retains it. Many of the species were formerly placed under *Torenia* L., *Craterostigma* Hochst. or *Lindernia* All., a group of genera difficult to distinguish.

Cromidon Compton 7568020

Compton: 308 (1931); Hilliard: 315 (1990); Hilliard: 1 (1999).

Selago L., *Walafrida* E.Mey. & *Polycarena* Benth. in part, Rolfe: 162 (1901).

Small annual or perennial herbs; stems often prostrate or decumbent, leafy, sometimes with axillary leaf tufts (incipient branches, not brachyblasts); hairs on stems, leaves, bracts and calyx with delicately sculptured walls. **Leaves** opposite, bases often connate, sometimes becoming alternate towards stem apex, usually cauline, rarely radical, elliptical, rarely ovate or uppermost spathulate, petiolate, entire or at times few-dentate, pubescent or sometimes ± glabrous. **Flowers** shortly pedicellate, usually crowded into racemose, ± globose heads or short spikes, these often arranged in corymbs or panicles. **Bracts** adnate to pedicel and up to half of calyx tube. **Calyx** usually obliquely and unequally 5-lobed, sometimes 3-lobed but anterior lobes may be retuse or toothed, at least these 2 lobes broadly deltoid, lobes not indurated with age. **Corolla** bilabiate, 4- or 5-lobed, membranous, persistent; tube funnel-shaped, glabrous; posterior lip (and sometimes anterior lip as well) bearded with minute 1-celled, clavate hairs, 1- or 2-lobed, often with a yellow/orange patch extending down throat, exterior in bud; anterior lip 3-lobed. **Stamens** 4, didynamous; filaments arising ± in middle of corolla tube, decurrent down tube; anthers unilocular, exserted. **Nectary** small, adnate on shorter side of ovary base. **Ovary** bilocular, elliptic-oblong, base slightly oblique; ovules 1 per locule, pendulous; style filiform; stigma lingulate with 2 marginal bands of stigmatic papillae. **Fruit** a pair of soft-walled cocci, outer face convex, smooth or rarely slightly rugose, inner face concave, indehiscent. **Seeds** ± elliptical, compressed, convex on one face, ± plane on other, amber-coloured, smooth.

Species 12, sthn Afr., concentrated in Western and Northern Cape, but 1 extending to Free State, 2 in Namibia.

Cycnium E.Mey. ex Benth. emend. Engl. 7623000

Bentham: 368 (1836a); Engler: 360 (1895); Hiern: 395 (1904); Hansen: 1 (1978); Visser: 82, 158, tt. 160–170 (1981); Philcox: 137 (1990); Mielcarek: 163 (1996).

Rhamphicarpa Benth. emend. Engl. in part; Hiern: 399 (1904).

Annual or perennial herbs, hemiparasitic on roots, turning dark on drying; stems erect to procumbent, simple to much branched; rhizomes tuberous or elongated, sometimes woody. **Leaves** opposite or subopposite, sometimes alternate or in whorls of 3, sessile or shortly petiolate, linear to ovate, entire or variously dentate. **Flowers** often large, axillary or supra-axillary, or in terminal spikes or racemes, pedicellate to sessile, bracteate and usually bibracteolate. **Bracts** leaf-like; bracteoles, when present, usually adnate to base of calyx, rarely arising on pedicel or above base of calyx. **Calyx** tubular, cylindrical or campanulate, rarely urceolate, (4)5-lobed, 10(11)-veined or -ribbed; tube straight; lobes equal or subequal, deltoid-ovate, lanceolate or linear, usually shorter than tube, rarely longer. **Corolla** bilabiate, 5-lobed, large, salverform, exserted, not persisting around fruit; tube slender, elongated, subcylindrical or sometimes gradually widening above, straight or gently curving near apex, usually with throat bearded; limb spreading; upper lip 2-lobed with lobes connate higher up than rest, interior in bud; lower lip 3-lobed, lobes shorter than tube, obovate. **Stamens** 4, didynamous, arising ± in middle of corolla tube, sometimes below, but pairs at 2 levels, included; filaments linear, unilaterally bearded; anthers unithecate, erect, dorsifixed; staminodes 0. **Ovary** bilocular, ovate or ovoid, ± compressed, glabrous; ovules many; style terete, straight, included, not exceeding lower pair of stamens, base persistent; stigma simple, terete or compressed, linear-lanceolate, slightly thickened, ± same length as style, sometimes 2-lobed. **Fruit** usually an ovoid, oblong or globose capsule, acute, apiculate or sometimes obliquely beaked and/or winged along 1 or both sutures, loculicidal along apical parts of both sutures or rarely dehiscing along upper-distal suture only, or fruit a globose to ovoid, indehiscent berry. **Seeds** small, ovoid or oblong; testa reticulate or reticulate-tuberculate, rarely almost smooth, firmly connected with lower cell layers. $x = 12$, 19 (1 report each, aneuploids, polyploidy).

Species 15, East Africa to sthn Afr.; 4 in sthn Afr., widespread, except Lesotho, Northern and Western Cape.

***Cymbalaria** Hill 7478000

Hill: 113 (1756); Martin & Noel: 96 (1960); Webb: 236 (1972); Wells *et al.*: 183 (1986); Sutton: 158, microfiche: 102 (1988).

Herbs, usually short-lived perennials but sometimes annuals, glabrous to villous; stems procumbent to decumbent. **Leaves** simple, opposite or alternate, reniform to orbicular, lobed or rarely entire, palmately veined, long-petiolate. **Flowers** irregular, pedicellate, solitary in leaf axils. **Calyx** deeply 5-lobed; lobes entire, valvate, thickened, unequal, with posterior lobe exceeding others, shorter than corolla tube. **Corolla** tubular, bilabiate; tube cylindrical with spur on anterior side of base; lips ± equal, posterior lip patent, exterior in bud, anterior lip spreading with prominent basal palate occluding mouth of tube; lobes entire. **Stamens** 4, didynamous, included, adjacent pairs of anthers marginally coherent; staminode minute. **Ovary** equally bilocular, septum erect, straight; style undivided, erect; stigma scarcely clavate, entire. **Fruit** a ± globose capsule, walls papery, usually many-seeded, dehiscing by several irregular, meridional fissures, from apex ± to base. **Seeds** broadly ellipsoid to globose, cristate or with some tubercles, ridges usually prominent; hilum subbasal. $x = 7$ (6) (aneuploids, high polyploidy).

Species 9, mainly Western Europe, Mediterranean to Iran; 1 in sthn Afr.: **Cymbalaria muralis* P.Gaertn., B.Mey. & Schreb. is cultivated and naturalised, or a sporadic adventive elsewhere in temperate regions; recorded in Gauteng (Pretoria), Western Cape (Stellenbosch) and Eastern Cape (Albany) as garden escape.

Dermatobotrys Bolus 7492000

Bolus: t. 1940 (1890); Engler: 497 (1897b); Hiern: 206 (1904); Phillips: t. 188 (1925); Hakki: 93 (1977).

Glabrous, epiphytic, softly woody, branched shrubs; stems ± quadrangular. **Leaves** opposite and decussate,

ovate or elliptical, petiolate, strongly toothed or repand-dentate; fleshy. **Flowers** usually 3 together, clustered at nodes of branchlets, shortly pedicellate; bracteate. **Calyx** 5-lobed, much shorter than corolla tube; lobes equal, lanceolate, valvate, glandular-papillose. **Corolla** slightly irregular, 5-lobed; tube long, somewhat incurved, cylindrical and ribbed in lower part, there also with stiff white hairs inside, funnel-shaped above; lobes ovate-oblong, obtuse, equal, much shorter than tube, posterior lobes outside in bud. **Stamens** 5, equal; filaments filiform, very short, subsessile, arising in corolla throat; anthers oblong, erect, bithecate, just appearing at mouth of corolla; thecae equal, parallel; staminodes 0. **Nectary** hypogynous, pulvinate, almost obsolete. **Ovary** bilocular, ovoid; ovules many; style filiform, equal or longer than corolla tube; stigma minutely bifid. **Fruit** a bilocular, ovoid-conical, fleshy, indehiscent berry. **Seeds** ellipsoid; testa thin, covered with short, disconnected ridges. $x = 19$ (1 report).

Monotypic: *Dermatobotrys saundersii* Bolus, KwaZulu-Natal and Eastern Cape; epiphytic on forest trees.

Diascia Link & Otto 7471000

Link & Otto: t. 7 (1820); Hiern: 139 (1904); Hilliard & Burtt: 269 (1984); Steiner & Whitehead: 259 (1988); Steiner: 175 (1990); Steiner: 13 (1992a); Steiner: 39 (1992b); Steiner: 202 (1992c); Steiner: 72 (1995); Steiner: 63 (1996); Steiner: 223 (1999).

Chamaecrypta Schltr. & Diels: 787 (1942).

Herbs, annual or perennial; stems usually slender, diffuse or erect, sometimes rigid. **Leaves** opposite or rosulate at base, with upper ones sometimes alternate, mostly petiolate, rarely sessile, variously shaped, from linear to suborbicular or sometimes oblanceolate to obovate, margins usually variously dentate, sometimes repand, pinnatifid or pinnatisect, rarely entire, usually glabrous; upper leaves often somewhat different. **Flowers** solitary, axillary or subfasciculate, or in terminal racemes, bracteate. **Calyx** 5-lobed; segments lanceolate, ovate or oblong, somewhat imbricate, slightly accrescent in fruit. **Corolla** usually tubular, bilabiate; tube very short, sometimes invaginated or obsolete; limb flattened, rotate or concave; posterior lip bi- or quadrifid, exterior in bud; anterior lip trifid or simple, middle or only lobe often emarginate, lobes ± rounded; throat usually produced below anterior lip into 2 (rarely 1 or 0) pits, pouches, or spurs wherein oil-secreting trichomes are found in several species; windows (patches of translucent material) usually present, either at base of lateral corolla lobes, associated with openings to pouches or spurs, or central at base of upper lip, and there sometimes split into 2 contiguous or separate parts; very rarely windows absent; central posterior window varies in form from ± flat to pouched or drawn out into a short hollow cone. **Stamens** (2)4, didynamous, arising in mouth of corolla tube; posterior pair with anthers; anterior pair usually bent near base, passing round posterior pair and coming to be in posterior position, rarely with anthers 0; some or all filaments broadened, sometimes with a projecting appendage; anthers bithecate but 1-celled as thecae confluent, usually cohering in pairs; staminodes 0(2). **Ovary** bilocular, usually ovoid; ovules many; style simple, terete, shorter or somewhat longer than ovary; stigma simple or capitate. **Fruit** an obliquely ovoid, subglobose or elongated, obtuse, septicidal capsule, not or scarcely compressed; valves inflexed at lateral margins, entire or emarginate. **Seeds** many, brown, usually curved, often with hollow on ventral side filled with ± cup-shaped or bulbous outgrowth of seed coat with various apertures, usually ribbed and not winged, sometimes pitted or reticulate and/or winged, rarely straight and/or smooth to granulate or muricate. $x = 9$ (B-chromosomes—1 report, aneuploids, polyploidy).

Species ± 60, sthn Afr., widespread, few in Namibia and Free State, more in KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape, with mostly perennial species in the east and annual ones in the west. Pollinated mainly by oil-collecting bees.

Diclis Benth. 7477000

Bentham: 23 (1836b); Hiern: 200 (1904); Merxmüller & Roessler: 23 (1967a); Hilliard & Burtt: 311 (1979); Philcox: 12 (1990).

Annual or perennial herbs; stems creeping, prostrate or decumbent, rarely erect, much branched; roots fibrous or sometimes fleshy. **Leaves** opposite or upper ones alternate, usually broadly ovate or obovate to rotund, petiolate, toothed to subentire or repand. **Flowers** solitary, axillary, pedicellate, ebracteolate. **Calyx** 5-partite, usually glandular, hairy; segments scarcely imbricate, somewhat accrescent in fruit. **Corolla** tubular, bilabiate, 5-lobed; tube short with basal, dependent spur; posterior lip exterior in bud, 2-lobed; anterior lip 3-lobed. **Stamens** 4, didynamous; arising low in corolla tube; anterior pair longer than posterior pair and with filaments bent at base, passing round posterior pair and coming to be in posterior position; filaments linear, glandular, hairy; anthers all connate or connate in pairs about the stigma; unithecate by confluence; staminodes 0. **Ovary** bilocular, elliptic, glandular-hairy; ovules many; style linear, slightly longer than ovary; stigma shortly bilobed or apparently capitate. **Fruit** a subglobose, loculicidal capsule, clearly or obscurely emarginate; valves furrowed down middle and at length bipartite. **Seeds** many, subglobose; testa brown, membranous and reticulate.

Species ± 10, Africa and Madagascar; ± 4 in sthn Afr., widespread but not in Western Cape.

Dintera Stapf 7551000

Stapf: 27, t. 1, A (1900); Hemsley & Skan: 350 (1906); Merxmüller & Roessler: 24 (1967a).

Dwarf, submerged, turf-forming, aquatic herbs; stems branching chiefly near base, broadly 4-winged. **Leaves** opposite, sessile, ovate, semi-amplexicaul, acute. **Flowers** cleistogamous, minute, leaf-axillary, solitary, sessile, ebracteate. **Calyx** deeply 5(6)-lobed, accrescent; lobes oblong, obtuse, much longer than tube. **Corolla** bilabiate, 5-lobed, ellipsoid, ± as long as calyx; tube sprinkled with sessile glands inside on anterior part, closed by minute lips; upper lip outside in bud, shortly 2-lobed; lower lip 3-lobed, somewhat shorter than upper. **Stamens** 2, anterior; filaments very short, glabrous, arising above middle of corolla tube, bithecate; thecae unequal, indehiscent or imperfectly dehiscent, connective between thecae distinct; staminodes 0. **Ovary** unilocular, ellipsoid-globose; ovules many; placentas parietal, bifurcate, shield-shaped; style very short; stigma somewhat thickened. **Fruit** an orbicular-obovate capsule, somewhat compressed on one side, septicidal at apex or bursting irregularly. **Seeds** many, oblong, ± compressed, pitted.

Monotypic, *Dintera pterocaulis* Stapf, Namibia (Waterberg plateau).

Dischisma Choisy 7567000

Choisy: 93 (1823); Rolfe: 111 (1901); Merxmüller & Roessler: 2 (1967b); Roessler: 90, t. 48 (1979); Hilliard: 315 (1990); Hilliard: 1 (1999).

Annual or perennial herbs or shrublets; hairs, other than in corolla tube, thin-walled. **Leaves** alternate or lower ones opposite, mostly linear to ± lanceolate or oblong, seldom ovate, sessile, entire or ± dentate. **Flowers** sessile, bracteate, in terminal, often dense spikes. **Bracts**

free from and exceeding calyx, mainly ovate but apex often acuminate, long-lanceolate or linear; often pubescent. **Calyx** bipartite; segments lateral, linear or lanceolate-oblong, entire, sometimes with membranous margins, sometimes ciliate. **Corolla** tubular, very irregular, unilabiate, 4-lobed; tube slender, cylindrical, sometimes glandular within, split in front to or below middle, dilated behind and expanded into a flat or concave, 4-lobed limb, bearded or glabrous but without orange patch; lobes subequal or middle pair longer, posterior lobes exterior in bud. **Stamens** 4, didynamous, arising at 2 levels ± on margins of fissure below corolla lobes or lower pair deeper in tube; filaments linear or terete; anthers bithecate, oblong or linear, sometimes longer than filaments. **Nectary** often present laterally at base of ovary. **Ovary** bilocular, elliptical; ovules 1 per locule, pendulous; style terete, included or exserted. **Fruit** oblong, ovate, or subterete, rarely spontaneously breaking into 2 hard-walled cocci. **Seeds** fusiform.

Species 11, Namibia and coastal districts of Western and Eastern Cape to near Port Elizabeth.

Dopatrium Buch.-Ham. ex Benth. 7541000

Bentham: 30 (1835); Bentham: 953 (1876); Hemsley & Skan: 324 (1906); Philcox: 51 (1990); Mielcarek: 46 (1996); Fischer: 527 (1997b).

Annual herbs, slender, erect, glabrous, somewhat fleshy, sometimes aquatic, branching mainly at base. **Leaves** opposite, crowded towards base of stem, becoming smaller, few and distant above, simple, linear-lanceolate, or oblong to ovate, entire, obscurely palmately veined. **Flowers** solitary in axils of upper leaves, pedicellate, chasmogamous, or sometimes lower flowers sessile to subsessile, cleistogamous; pedicels filiform, ebracteolate. **Calyx** tubular, 5-lobed to ± halfway; lobes narrow, obtuse, imbricate. **Corolla** bilabiate; tube ± campanulate, mouth wide; upper lip entire or 2-lobed, outside in bud; lower lip very broadly 3-lobed, mid-lobe deeply bifid; all lobes spreading. **Stamens** 2, posterior, included; filaments short, filiform, arising in upper part of corolla tube; anthers bithecate; thecae equal, parallel, separate, glabrous, held apart by a connective with 2 short arms (slightly stipitate); staminodes 2, anterior, minute or 0. **Ovary** bilocular, globose or ovoid; ovules many; style filiform, straight, persistent; stigma slightly 2-lobed, somewhat peltate. **Fruit** a spherical, loculicidal capsule; valves 2, entire or bifid. **Seeds** small, many, ± ovate, tuberculate. $x = 7$.

Species 14, tropical, Africa, Asia and Australia: 1 in sthn Afr.: *Dopatrium junceum* (Roxb.) Buch.-Ham. ex Benth., Botswana, Northern Province, Mpumalanga (Messina and Nelspruit Districts and Kruger National Park) and Swaziland; seasonal semi-aquatic in or around pools on granite rock or in grassland.

Freylinia Colla 7497000

Colla: 56 (1824); Hiern: 214 (1904); Van Jaarsveld: 57 (1983); Philcox: 20 (1990); Van Jaarsveld: t. 2033 (1991); Van Jaarsveld: 68 (1995).

Shrubs or subshrubs; branches usually glabrous with ribs due to decurrent leaf bases. **Leaves** opposite, verticillate or scattered, usually variously linear or lanceolate to ovate, sometimes obovate or oblanceolate, sessile to shortly petiolate, elliptical or mostly acute, often apiculate or mucronate, entire, or rarely toothed in upper half, flat, undulate or crisped, base sometimes decurrent, midrib usually prominent, often leathery. **Flowers** solitary or in terminal and axillary cymes, shortly pedicellate, usually bracteate and bracteolate. **Bracts** usually similar to leaves but smaller. **Calyx** campanulate, 5-lobed; lobes ovate, elliptic or lanceolate, imbricate. **Corolla** 5-lobed, regular; tube funnel-shaped or subcylindrical, straight, exceeding calyx; limb patent, regular; lobes much shorter than tube, spreading, obtuse, imbricate, 2 posterior lobes exterior in bud. **Stamens** 4, didynamous, included or scarcely exserted; filaments terete or linear, arising ± at or above middle of corolla tube; anthers with 2 ± parallel, erect thecae; staminodes sometimes 1, rudimentary. **Nectary** saucer- or cushion-shaped. **Ovary** bilocular, ellipsoid; ovules several; style thick, linear, scarcely exserted, with capitate or globose stigma. **Fruit** an ovoid, obtuse, septicidal capsule; valves bifid. **Seeds** discoid with a membranous wing and testa.

Species 9, tropical (1) and sthn Afr.; 9 in sthn Afr., 1 in Northern Province (Waterberg), rest in Western and Eastern Cape; usually montane habitats.

Gerardiina Engl. 7605000

Engler: 507, t. 10, G-M. (1897b); Hiern: 770 (1898); Hiern: 378 (1904); Philcox: 154 (1990).

Annual or perennial herbs, erect or ascending, 0.35–0.8 m in height, hispid; stems usually simple. **Leaves** opposite, sessile, erect or suberect, linear-lanceolate, entire, thick, hispid. **Flowers** opposite, pedicellate, bracteate, in terminal, elongated, rarely branched racemes. **Bracts** ± equal to or shorter than pedicels; bracteoles 0. **Calyx** 5-dentate, somewhat leathery, glandular-punctate; tube campanulate; lobes subequal, obtuse, valvate. **Corolla** campanulate, oblique, 5-lobed, slightly bilabiate; tube narrow at base, dilating and ± funnel-shaped above, hairy on inside at base of upper lip; lobes subequal, or upper 2 smallest, rounded; posterior lobes interior in bud. **Stamens** 4, didynamous, arising at top of narrow portion of tube, included; filaments linear, anterior pair twice as long as posterior pair and long-pilose above middle; anthers bithecate; thecae subequal, diverging; staminodes 0. **Ovary** bilocular, subovoid, acute, glabrous; ovules many on a thick placenta; style filiform, linear, arching above, glabrous, persistent, equalling or exceeding longer stamens; stigma slightly dilated, flattened. **Fruit** an ovoid, loculicidal capsule, equal to or somewhat longer than enclosing calyx. **Seeds** many, linear or linear-cuneiform, terete.

Monotypic, tropical and sthn Afr.: *Gerardiina angolensis* Engl., Northern Province, Mpumalanga and Swaziland.

Glekia Hilliard 7521010

Hilliard: 481 (1989); Hilliard: 416 (1994).

Phyllopodium Benth. in part; Hiern: 321 (1904).

Twiggy shrublets; stems leafy, pubescence confined to two narrow ridges spanning internodes, hairs ± retrorse, eglandular, but sometimes minute, patent, glandular. **Leaves** (and **bracts**) usually opposite and decussate, rarely subopposite, elliptical, gradually narrowed below into very short petiolar part, bases connate and decurrent in two narrow ridges, finely callose-toothed, thick, glandular-punctate and partly puberulous. **Flowers** solitary in upper leaf axils, forming terminal, racemose, round heads, oblong in fruit, sometimes further arranged in corymbose panicles. **Bracts** adnate to pedicel and halfway up calyx tube. **Calyx** bilabiate, 5-lobed, membranous; lobes unequal, ciliate. **Corolla** bilabiate, thick-textured, not persistent; tube cylindrical below, abruptly campanulate above, glabrous outside, inside heavily bearded round mouth with unicellular clavate hairs; posterior lip 2-lobed with orange patch at base extending down inflated part of tube, exterior in bud; anterior lip 3-lobed; lobes entire, rotund. **Stamens** 4, didynamous; filaments short, arising in throat, not decurrent down tube; posterior pair lying in throat; anterior pair exceed-

ing posterior pair, shortly exserted; anthers dorsifixed, synthecate; staminodes 0. **Nectary** at base of ovary, on shorter side. **Ovary** bilocular, elliptical; ovules ± 9–16 per locule; style long, filiform, passing gradually into lingulate stigma with two marginal bands of stigmatic papillae, exserted. **Fruit** a septicidal capsule with a short loculicidal split at tip of each valve. **Seeds** obscurely 3-angled or flattened, irregularly wrinkled on one face; testa tightly investing endosperm, opaque, creamy or pale amber.

Monotypic: *Glekia krebsiana* (Benth.) Hilliard; sthn Afr., Lesotho and Eastern Cape mountains from Lady Grey and Queenstown to Somerset East and Graaff-Reinet.

Globulariopsis Compton 7568030

Compton: 309 (1931); Compton: 135 (1943); Hartley & Balkwill: 471 (1990); Hilliard: 318 (1990); Hilliard: 1 (1999).

Annual or perennial herbs or shrublets; stems erect or decumbent, often several from crown, rarely one, usually simple below, branched above; hairs on stems, leaves, bracts and calyx with sculptured walls. **Leaves** opposite or alternate, sometimes becoming alternate above, fascicled or not, linear or narrowly to broadly elliptic, entire or few-dentate, herbaceous to thick (almost terete). **Flowers** bracteate, pedicellate, grouped in small, congested or lax racemes, usually panicled, sometimes solitary. **Bracts** usually adnate to pedicel only, sometimes to extreme base of calyx tube as well. **Calyx** campanulate, subequally 5-lobed to ± halfway; lobes deltoid or oblong, anterior ones slightly larger than other 3, pubescent on outside and margins, rarely inside. **Corolla** bilabiate, 5-lobed, herbaceous; tube funnel-shaped, usually glabrous; limb glabrous on inner face, yellow-orange patch running down back of throat; posterior lip 2-lobed, glabrous, exterior in bud; anterior lip 3-lobed. **Stamens** 4, didynamous, arising ± in middle of corolla tube; posterior filaments decurrent down corolla tube; anthers synthecate, posterior ones in throat or mouth, or shortly or (rarely) well exserted, anterior ones shortly to well exserted; staminodes 0. **Nectary** small, on posterior side of ovary base. **Ovary** unilocular by complete or partial abortion of posterior locule, ellipsoid; ovule single, pendulous; style filiform, merging into lingulate stigma with marginal papillae. **Fruit** a smooth, hard-walled, somewhat beaked, single-seeded, indehiscent coccus, convex on outer face, concave on inner, held within persistent calyx, apparently shed as a unit with bract. **Seeds** probably fusiform.

Species 7, endemic to Western Cape, mostly in the southwestern mountains.

Glumicalyx Hiern 7593010

Hiern: t. 2769 (1903); Hiern: 369 (1904); Marloth: 129 (1932); Junell: 172 (1961); Hilliard & Burtt: 155 (1977); Hilliard: 526 (1994).

Perennial herbs or dwarf shrublets; stems leafy throughout, pubescent, hairs retrorse and minutely glandular. **Leaves** opposite below, alternate above, simple, variously elliptical and oblong to oblanceolate, often narrowed to petiole-like, sometimes half-clasping or connate base, usually toothed, thick or leathery, glandular-punctate, sometimes also with glandular and/or eglandular hairs; radical leaves sometimes present. **Flowers** in a terminal, cone-shaped, very congested head, nodding in flower, erect and elongated in fruit. **Bracts** broad, clearly distinct from leaves, adnate to pedicel, free from calyx. **Calyx** unequally 5-lobed, rarely 2 anterior lobes obsolete, split nearly or quite to base at least on anterior side, thin-textured. **Corolla** slightly bilabiate, glabrous, thick, leathery when dry; tube funnel-shaped; posterior lobes exterior in bud, lobes spreading, oblong to suborbicular, entire, margins pale, thin-textured. **Stamens** 4, didynamous, arising near top of corolla tube, 2 or 4 exserted; posterior filaments decurrent ± to base of tube; anthers synthecate, dorsifixed; staminodes 0. **Nectary** at base of ovary on posterior side. **Ovary** bilocular, ± oblong; ovules 7–many per locule; stigma lingulate, flattened, with 2 marginal bands of stigmatic papillae, exserted. **Fruit** a septicidal capsule with a short loculicidal split at tip of each valve, glabrous. **Seeds** angled by pressure, sinuously colliculate, reddish brown. $x = 7$.

Species 6, sthn Afr., mainly Lesotho, also nearby in South Africa, in Free State, KwaZulu-Natal and Eastern Cape, along Drakensberg from Harrismith and Golden Gate to Barkly East and Lady Grey.

Gosela Choisy 7570000

Choisy: 22 (1848); Rolfe: 177 (1901); Hartley & Balkwill: 471 (1990); Hilliard: 318 (1990); Hilliard: 1 (1999).

Perennial, heath-like shrublets; branches slender; many axillary brachyblasts present; hairs on stems, leaves, bracts and calyx with sculptured walls. **Leaves** alternate, linear, ± fascicled. **Flowers** bracteate, sessile, in compact spikes with lower flowers longer than upper, resulting in corymb-like spike; elongate in fruit. **Bracts** free from calyx, ovate-lanceolate, villous, much shorter than corolla tube. **Calyx** tubular, 5-lobed, bilabiate, villous, shorter than bracts; tube shallowly campanulate; lobes at least equal to tube in length, 2 posterior ones incompletely divided. **Corolla** tubular, 5-lobed, leathery; tube long, cylindrical, widening slightly towards apex; limb much shorter; posterior lip 2-lobed, without orange patch, exterior in bud; anterior lip 3-lobed; lobes subequal, spreading, obovate-oblong. **Stamens** usually 4, rarely 2 (posterior), if 4, didynamous; posterior pair arising high in corolla tube, with filaments adnate to tube for most of their length, free part shorter than included anthers; anterior pair with longer filaments but smaller anthers, arising in mouth of tube, exserted; if 2 stamens either anterior filaments with sterile anthers or these stamens completely aborted; filaments linear; anthers synthecate, dorsifixed; staminodes 0(2). **Nectary** single, basal on posterior side of ovary. **Ovary** bilocular, ellipsoid to elongate; ovules 1 per locule; or sometimes ovary unilocular with anterior locule absent or ovule aborted; style slender, terete, exserted; stigma linear, flat. **Fruit** of 1 or 2 hard-walled cocci, enclosed in persistent calyx, convex on one side, curved, bluntly beaked. **Seeds** fusiform with fleshy testa.

Monotypic: *Gosela eckloniana* Choisy, Western Cape: Clanwilliam, Ceres and Piquetberg Districts.

Graderia Benth. 7614000

Bentham: 521 (1846); Hiern: 388 (1904) under *Bopusia* C.Presl; Melchior: 603 (1932); Philcox: 149 (1990).

Compact, perennial, semiwoody herbs or undershrubs, many-stemmed from a woody rootstock; stems erect or ± trailing, usually branched at or near base, leafy. **Leaves** opposite, alternate, or whorled, ovate-elliptic to lanceolate or linear, incised-dentate to entire. **Flowers** solitary in axils of upper leaves, subsessile to shortly pedicellate, bibracteolate at or near base of calyx. **Calyx** tubular, 5-lobed; tube campanulate or funnel-shaped, 10-nerved; lobes ± equal, triangular-lanceolate, equalling or rather longer than tube, somewhat accrescent. **Corolla** tubular, somewhat bilabiate, 5-lobed, pilose; tube funnel-shaped, somewhat ventricose, exserted; limb spreading; lobes obovate, entire, subequal, the 2 posterior ones interior, shorter than tube. **Stamens** 4, didynamous, included; posterior pair short, arising below

middle of corolla tube; anterior pair longer, arising near base of tube; filaments filiform, hairy at least towards base; anthers bithecate, free; thecae separate, diverging, mucronulate at base, with one usually narrower than other. **Ovary** bilocular, ovate to globular, compressed; ovules many per locule; style filiform, glabrous, somewhat exserted, incurved above, persistent; stigma short, bifid, sometimes also slightly thickened or subglobose. **Fruit** an acute or acuminate, loculicidal capsule, flattened longitudinally, therefore appearing unilaterally winged, included in persistent calyx. **Seeds** many, obovoid-cylindrical; testa membranous, reticulate.

Species 5, Africa and Socotra; 3 in sthn Afr., widespread in eastern and southern parts: roughly from Pilgrim's Rest (Mpumalanga) to Riversdale (Western Cape); not in Namibia, Botswana, Lesotho or Northern Cape.

Halleria L. 7493000

Linnaeus: 625 (1753) excl. var. ß; Hiern: 207 (1904); Batten & Bokelmann: 133, t. 166 (1966); Philcox: 16 (1990).

Shrubs or small trees, glabrous. **Leaves** opposite, petiolate, ovate or elliptic, dentate or subentire. **Flowers** many, pedicellate, bibracteolate and subfascicled in clusters in leaf axils, sometimes solitary or on old wood without leaves. **Calyx** 3–5-cleft, very much shorter than corolla tube, cup-shaped or subrotate. **Corolla** 4- or 5-lobed, ± bilabiate, sometimes regular; tube curved or straight, sometimes slightly gibbous at base in front, inflated above to funnel-shaped, oblique or not at mouth, pubescent within lower, cylindrical portion; upper lip 2-lobed, exterior in bud; lower lip shortly 3-lobed; lobes subequal, much shorter than tube. **Stamens** 4, didynamous or subequal, exserted or shortly included; filaments filiform, arising subcentrally or lower in corolla tube; anthers bithecate; thecae diverging, at length divaricate; staminodes 0. **Nectary** cushion-shaped. **Ovary** bilocular, ovoid, with many ovules; style long, filiform, usually exserted, persistent; stigma simple or 2-lobed. **Fruit** a globose, indehiscent berry. **Seeds** compressed, narrowly winged, buried in jelly-like flesh.

Species 10, Yemen, Madagascar, Africa; Ethiopia to Cape Peninsula, also in Angola; 3 in sthn Afr., widespread but not in Namibia or Northern Cape; in montane to riverine forest, scrub and bush.

Harveya Hook. 7627000

Hooker: t. 118 (1837); Bentham: 967 (1876); Hiern: 400 (1904); Visser: 82, 161, tt. 185–199 (1981); Hilliard & Burtt: 377 (1986b); Philcox: 93 (1990).

Annual or rarely perennial herbs, holoparasitic on roots, lacking chlorophyll, coloured but mostly drying dark; stems erect or ascending, simple or branched mostly at base, usually angular, often furrowed. **Leaves** usually scale-like, at least lower ones, opposite or subopposite, sometimes alternate above, often close or crowded at base and upper ones more distant to scattered, sometimes few. **Flowers** usually large, ± sessile to pedicellate, axillary, bracteate and bibracteolate, in terminal, lax or dense, few- to many-flowered racemes or spikes, sometimes elongating in fruit. **Bracts** opposite or uppermost alternate; bracteoles arising above middle to near or at pedicel apex, rarely adnate to calyx. **Calyx** tubular, 5-lobed, sometimes bilabiate, pilose or glandular-hairy; tube campanulate or oblong, rarely dimidiate, somewhat inflated or lax, angular or ribbed; lobes unequal, usually longer than tube, valvate in bud. **Corolla** tubular, 5-lobed, somewhat bilabiate, various colours but if yellow, veins not dark; tube gently curved, usually narrow, globose at base and much enlarged, subcylindrical or funnel-shaped above, or ventricosely inflated; limb oblique or nearly regular, spreading or obliquely cup-shaped; lobes rounded or broadly obovate, entire or denticulate; upper 2 lobes interior in bud, sometimes connate higher up than others. **Stamens** 4, didynamous or ± equal, included or scarcely exserted; filaments linear, arising about or below middle of corolla tube; anthers approximated in pairs, bithecate; thecae parallel or transverse, unequal, one fertile, acuminate, acute or mucronate at base, the other barren, longer and subulate-acuminate, or rarely subobsolete. **Ovary** bilocular, obovate, elliptic or ovate; placentation axile; ovules very many; style filiform, somewhat flattened, ± as long as corolla tube, curved downwards near apex when ready for pollen; stigma thickened and various in shape. **Fruit** a globose, ovoid or conical, somewhat compressed, 2-grooved, loculicidal capsule. **Seeds** very many, small, irregularly oblong, truncate; testa reticulate, loose, membranous.

Species 40, mostly Africa; 1 in Mascarenes; ± 25 in sthn Afr., widespread but not in Namibia or Botswana.

Hebenstretia L. 7566000

Linnaeus: 629 (1753); Linnaeus: 277 (1754); Rolfe: 264 (1900); Rolfe: 96 (1901); Merxmüller & Roessler: 2 (1967b); Roessler: 1, figs 1–47 (1979); Philcox: 161 (1990); Hilliard: 315 (1990); Hilliard: 1 (1999). Formerly often given as *Hebenstreitia*.

Annual or perennial herbs, or undershrubs; hairs on stems, leaves, bracts and calyx thin-walled. **Leaves** alternate or lower ones opposite, or appearing fasciculate with smaller leaves clustered in axils, entire or toothed. **Flowers** sessile, bracteate, in terminal, short or elongate, usually dense, often paniculate spikes. **Bracts** adnate to and exceeding calyx, usually imbricate, lowest often leaf-like, ovate to long-lanceolate, usually glabrous. **Calyx** spathaceous (no lobes); apex posterior, entire or emarginate, membranous or subhyaline, often 2-veined. **Corolla** tubular, very irregular, unilabiate, rarely bilabiate; tube slender, divided in front to or below middle, expanded behind into a flat or concave, 4-lobed limb, bearded or glabrous; lobes equal or sometimes with 2 lateral lobes larger than middle ones, latter sometimes ± connate and longer than former ones, sometimes with fifth, minute lobe in fissure of tube; often with orange patch, sometimes wanting; posterior lobes exterior in bud. **Stamens** 4, didynamous, arising ± on margins of fissure below corolla lobes or lower pair deeper in tube; filaments short, linear; anthers synthecate, dorsifixed, oblong or linear; staminodes 0. **Nectary** often present at base of ovary on posterior side. **Ovary** oblong or elliptical, bilocular; ovules 1 per locule, pendulous; style terete or linear, entire, usually shorter than corolla tube but exserted through slit in tube. **Fruit** an oblong to ovoid, rarely round, subterete or compressed capsule, rarely separating spontaneously into 2 distinct, (sometimes 1 aborted) hard-walled cocci at maturity. **Seeds** fusiform; testa tough. $x = 7$ (1 report).

Species 25, tropical and sthn Afr.; 25 in sthn Afr., widespread but mostly in Western Cape, the species numbers decreasing eastwards and northwards.

Hemimeris L.f. 7472000

Linnaeus fil.: 45 (1782, '1781') name conserved; Hiern: 164 (1904); Grant: 435 (1938); Merrill: 366 (1938); Greuter *et al.*: 297 (1994); Steiner: 63 (1996); Mabberley: 335 (1997).

Annual, slender herbs; stems simple or ± freely branched, quadrangular, often channelled or ridged, branches opposite. **Leaves** opposite, uppermost sometimes alternate, sometimes with smaller leaves fascicled in axils, usually petiolate, rarely sessile, variously ovate to ± linear or obovate to oblong, toothed, lobed or pinnatifid, rarely subentire. **Flowers** axillary or terminal,

usually in condensed apical racemes, often with very short internodes and appearing umbellate, or solitary; pedicels longer than flowers, often reflexed in fruit; pollinated by oil-collecting bees. **Calyx** campanulate, 5-lobed; lobes free nearly to base, usually lanceolate, somewhat unequal, scarcely imbricate in bud. **Corolla** sub-bilabiate, 4-lobed, yellow, generally villous outside; tube very short, concave or obsolete; throat short; upper lip smaller than lower one, exterior in bud, very shortly emarginate, usually with reflexed margin and ± well-developed pouch near centre; lower lip 3-lobed, lateral lobes short, broad, usually with subsessile glands towards base and 2 spurs or small pouches at base of lip, sometimes with 2 tooth-like appendages clasping stamen filaments at side of corolla throat; lowermost lobe larger, concave, usually emarginate. **Stamens** 2; filaments arising in throat, short, linear, kneed at base, often narrowly winged; anthers unithecate through confluence, usually connivent when mature. **Ovary** bilocular, usually ovoid, merging into style; ovules many; style persistent, usually declined, often winged; stigma often capitate, thinly stigmatose. **Fruit** a subglobose or ovate capsule, mostly loculicidal, partly septicidal. **Seeds** many, brown or black, angular-ovoid or subglobose, reticulate or papillate, sometimes with very narrow, membranous wing.

Species ± 4, Northern, Western and Eastern Cape (Vanrhynsdorp and Calvinia through coastal districts to Port Elizabeth).

Hiernia S.Moore 7615000

Moore: 196, t. 211 (1880) under Acanthaceae; Clarke: 261 (1900) under Acanthaceae; Merxmüller & Roessler: 24 (1967a) under Scrophulariaceae.

Perennial undershrubs; branches opposite, rigid, spreading almost at right angles; viscid-pubescent. **Leaves** opposite, sessile, narrow, oblong or lanceolate, scabrid. **Flowers** solitary, axillary, shortly pedicellate or subsessile, ebracteolate. **Calyx** tubular-campanulate, 5-lobed, 10-ribbed; tube cylindrical; lobes lanceolate, shorter than tube. **Corolla** tubular, slightly irregular, 5-lobed; tube a little curved, funnel-shaped, ± as long as calyx; lobes obovate, shorter than tube, spreading; 2 posterior ones somewhat united, partly or wholly interior in bud. **Stamens** 4, didynamous, subequal, arising ± in middle of corolla tube, exserted; filaments filiform, slightly longer in one pair, with membranous margins; anthers linear-oblong, unithecate by abortion, dehiscing by short, apical slit, second theca represented by minute wart at apex of filament. **Ovary** unequally bilocular, ovoid; ovules 6–10 in 2 rows in each locule; style terete, exserted; stigma simple. **Fruit** a very oblique capsule, flattened laterally and grooved down each side, somewhat acute above, ± as long as retaining calyx. **Seeds** subquadrate; funicle somewhat elongated and enlarged above; testa mucilaginous and swelling on wetting.

Monotypic: *Hiernia angolensis* S.Moore, Angola and Namibia.

Hyobanche L. 7629000

Linnaeus: 155 (1771); Hiern: 415 (1904); Merxmüller & Roessler: 25 (1967); Visser: 82, 163, tt. 200–209 (1981).

Herbs, holoparasitic on roots, whole plant lacking chlorophyll, usually coloured; root system modified into a haustorium attached to host; stems usually subterranean, short, simple, erect or ascending, somewhat fleshy, sometimes almost woody. **Leaves** scale-like, imbricate, scattered or dense, adpressed to stem, suborbicular, ovate or elliptical, usually enlarging gradually up stem. **Flowers** many, rather large, showy, sessile or very shortly pedicellate, bracteate and bibracteolate, in ± dense, terminal or subterminal spikes, these sometimes subcorymbose to subcapitate. **Calyx** tubular, 5-lobed, sometimes deeply so, or 5-cleft, rarely cleft nearly to base at back; lobes unequal or ± equal, usually with 2 pairs joined high up and odd one free. **Corolla** tubular, ± cylindrical to obovoid, irregular, bi- or unilabiate, usually 3-lobed or 3-dentate, exceeding calyx; tube ± curved forwards or nearly straight; limb sometimes ± arched, hooded or almost helmeted; lobes much shorter than tube, often obscure, sometimes with 2 forming a hood and 1 small lobe, together forming an oblique to vertical, slit-like or gaping mouth; posterior lobes probably interior in bud. **Stamens** 4, didynamous or nearly equal, arising about or below middle of corolla tube, sometimes at base, included or slightly exserted; filaments linear, glabrous, pilose or villous at base; anthers approximated in pairs, pendulous, blunt or scarcely mucronate at base, glabrous, unithecate. **Ovary** bilocular, oval, ovoid-conical or subglobose; ovules very many; placentas geminate or bifid, prominent; style linear, slightly exserted, bent downwards above, glabrous, exceeding stamens; stigma thickly clavate or subglobose, emarginate or somewhat 2-lobed. **Fruit** a subglobose, fleshy capsule, at length deliquescent. **Seeds** very many, minute, globose; testa loose, reticulate.

Species ± 7, sthn Afr., widespread, but scattered and uncommon, not in Botswana, Northern and North-West Provinces, Gauteng or Mpumalanga.

Ixianthes Benth. 7498000

Bentham: 54 (1836c); Hiern: 216, (1904); Steiner: 7 (1993).

Erect, branched shrubs. **Leaves** closely set and overlapping, whorled, narrow, linear, serrated in upper half, leathery. **Flowers** many, axillary, solitary or in few-flowered cymes, crowded among upper leaves. **Calyx** 3-partite; lobes ovate-lanceolate, acuminate, ribbed, valvate, glandular-pubescent; posterior lobe broader than others, trifid; anterior lobes entire. **Corolla** 5-lobed; bilabiate, densely viscid-pilose outside; tube wide, with pouch on anterior side lined with stalked, oil-secreting trichomes; posterior lip bilobed, exterior in bud; anterior lip slightly shorter and deeply 3-lobed; lobes obtuse, ± as long as tube. **Stamens** 2, included, lying along upper side of pouch with stigma; filaments rather thick, terete, glabrous, arising at base of corolla tube; anthers kidney-shaped, bithecate; thecae divaricate, confluent at apex; staminodes 2 or 3, setiform. **Nectary** 0. **Ovary** bilocular, ovoid, densely glandular; ovules many; style rather thick, linear, included; stigma simple. **Fruit** an ovoid, subtetragonal, acute, septicidal capsule; valves bifid. **Seeds** many, ovoid-oblong, truncate; testa reticulate, membranous.

Monotypic: *Ixianthes retzioides* Benth., Western Cape, central Cederberg south to Tulbagh; usually rooted in water, occasionally submerged; pollinated by oil-collecting bees.

Jamesbrittenia Kuntze 7519010

Kuntze: 461 (1891); Hemsley & Skan: 298 (1906); Andrews: 137 (1956); Hilliard: 84 (1994).

Sutera Roth: 291 (1821) not of 1807, in part; Hiern: 243 (1904); Merxmüller & Roessler: 43 (1967a). *Lyperia* Benth.: 377 (1836a) in part, excl. lectotype; Hilliard: 90 (1994); *Peliostomum* Benth. in part, Hiern: 133 (1904); *Chaenostoma* Benth. in part; Thellung: 408 (1915).

Shrubs, suffrutices, perennial or annual herbs, glandular or rarely clad in scales, aromatic, often foetid; stems leafy. **Leaves** opposite, often alternate upwards, sometimes pseudofasciculate or crowded on very short brachyblasts, entire to deeply divided, not decurrent. **Flowers** solitary in axils of leaves or bracts, grouped in racemose inflorescences. **Bracts** very rare, never adnate

to pedicel or calyx. **Calyx** 5-lobed almost to base (rarely divided ± halfway), almost regular; lobes various in shape, usually entire, sometimes toothed, pubescent. **Corolla** ± 5-lobed; tubular, nearly regular to distinctly bilabiate; tube cylindrical, abruptly expanded near apex, mouth often round, sometimes compressed; limb: posterior lip usually 2-lobed, exterior in bud; anterior lip 3-lobed; lobes spreading, orbicular to oblong or cuneate, often entire, sometimes retuse to 2-lobed, usually glandular outside, with glistening glands and/or glandular hairs, rarely scales, inside with a broad transverse, V-shaped band of unicellular, clavate hairs in throat, usually extending a bit on to base of anterior lip. **Stamens** 4, rarely anterior pair 0 or much reduced, didynamous; filaments arising in swollen part of tube, posterior ones strongly decurrent and at least these pubescent; anthers synthecate, dorsifixed, usually included, anterior pair rarely just visible in throat or very shortly exserted. **Nectary** apparently annular, ± swollen on one side, sometimes resulting in a conspicuous lateral gland. **Ovary** bilocular, ± deltoid, usually glandular; ovules many per locule; stigma very short, minutely bifid, included. **Fruit** a septicidal capsule with a short loculicidal split at tip of each valve. **Seeds** ± oblong, reddish to greyish brown, not ribbed; testa thin, reticulate, tightly investing endosperm, rarely testa patterned with transversely elongated pits in a chequer-board pattern. $x = 6$ (polyploidy).

Species 83, 1 from Egypt and Sudan to Indian subcontinent, rest in Africa, Angola and Zambia southwards; 74 in sthn Afr., in all areas but with more species in the western than the eastern half.

*Kickxia Dumort. 7479000

Dumortier: 35 (1827); Fernandes: 238 (1972); Wells *et al.*: 653 (1986); Sutton: 169, microfiche 109 (1988).

Linaria Mill. in part; Hiern: 209 (1904); Wells *et al.*: 654 (1986).

Annual or perennial herbs; stems decumbent or prostrate to ascending, branching mainly from base, usually at wide angle. **Leaves** alternate (lowest sometimes opposite), homo- or heteromorphic, ± ovate to suborbicular (upper ones sometimes ovate-lanceolate), obtuse to emarginate or subacute, entire or ± dentate, base various, sometimes hastate or sagittate, palmately veined, subsessile to petiolate, petioles sometimes twining. **Flowers** irregular, pedicellate, solitary in leaf axils or in leafy racemes; pedicels ± patent, not reflexed. **Calyx** deeply 5-lobed; lobes entire, ± equal, imbricate, usually shorter than corolla tube. **Corolla** tubular, irregular; tube ± cylindrical or campanulate, usually with anterior, conical or cylindrical spur at base; limb bilabiate, lips sub- or unequal; posterior lip 2-lobed, shorter than anterior, ± patent, exterior in bud; anterior lip 3-lobed, usually broad and spreading with low basal palate partially occluding tube mouth; lobes entire. **Stamens** 4, didynamous, included; anthers marginally coherent forming a ring-like structure; staminode minute. **Ovary** bilocular; locules usually equal, with many, rarely few, ovules, or sometimes unequal with few ovules in anterior locule; style simple, erect; stigma capitate, entire. **Fruit** an ovoid to globose, leathery or papery capsule; septum erect, ± straight; locules dehiscent by a single pore with detachable lid, sometimes anterior one indehiscent. **Seeds** various in shape, often oblong-ellipsoid, alveolate or tuberculate; hilum median or rarely ± basal. $x = 9$ (polyploidy).

Species ± 46, West African islands, North Africa, Europe, south-central and SW Asia; widely naturalised in temperate regions; 1 or 2 in sthn Afr.: **Kickxia spuria* (L.) Dumort. subsp. *spuria*, and possibly **K. commutata* (Bernh. ex Rchb.) Fritsch, Western Cape, sporadic occurrence, usually near cultivated areas.

Limnophila R.Br. 7532000

Brown: 442 (1810) name conserved; Merxmüller & Roessler: 25 (1967a); Philcox: 101 (1970); Greuter *et al.*: 289 (1994); Philcox: 43 (1990); Mielcarek: 50 (1996).

Aquatic or marsh herbs, annual or perennial; aerial stems simple to much branched, glabrous or sometimes hirsute, often with pellucid dots and aromatic; submerged stems much branched, glabrous. **Leaves**: aerial ones opposite or verticillate, sessile, entire to serrate, laciniate or pinnately divided, punctate; submerged leaves laciniate, pinnatifid to capillary-multifid, glabrous. **Flowers** solitary and axillary, or in a dense, terminal raceme, sessile or pedicellate, bracteate; bracteoles 0 or 2. **Calyx** tubular, 5-lobed mostly to ± halfway, rarely shorter; lobes broadly ovate to lanceolate, sometimes acuminate, imbricate, subequal or posterior lobes larger. **Corolla** tubular, bilabiate, 5-lobed; tube cylindrical or funnel-shaped, glabrous or sparsely hirsute outside, sometimes villous or papillate inside; posterior lip entire or 2-lobed, outside in bud; anterior lip 3-lobed; lobes elliptical or ovate, slightly or much shorter than tube, erect or spreading. **Stamens** 4 (sometimes 2 in cleistogamous flowers), didynamous, included, posterior pair shorter; filaments linear, arising in corolla tube; anthers bithecate, free, sometimes contiguous at anthesis; thecae separate, usually shortly stalked; staminodes 0. **Ovary** bilocular, ovoid, glabrous; ovules many; style filiform, bent at right angles at apex; stigma bilamellate. **Fruit** an ovoid or ellipsoid, septicidal and loculicidal capsule, with 2, often bifid valves. **Seeds** small, many, ellipsoid; testa thin, dark-coloured. $x = 17$ (9, 15) (polyploidy).

Species 37, Old World tropics and subtropics, Africa, Asia, and Australia; 2 in sthn Afr., Namibia, Botswana and Mpumalanga (Kruger National Park); usually aquatic or amphibious, in shallow water or mud of bogs, swamps or riversides.

Limosella L. 7558000

Linnaeus: 631 (1753); Hiern: 356 (1904); Glück: 488 (1934); Merxmüller & Roessler: 26 (1967a); Hilliard & Burtt: 212 (1986a); Philcox: 73 (1990); Mielcarek: 64 (1996).

Marsh or aquatic, perennial herbs, tufted, creeping or floating; stemless or with stolons, rooting at nodes, glabrous. **Leaves** usually radical, sometimes fasciculate at nodes, rarely alternate, simple, usually petiolate, erect or floating, lamina linear, subulate, spathulate, oblong-ovate or suborbicular. **Flowers** usually solitary, axillary; pedicels ebracteolate, often deflexed in fruit. **Calyx** tubular, (4)5-lobed; tube funnel-shaped or campanulate; lobes subequal, usually shorter than tube, rarely longer. **Corolla** tubular, 5-lobed, subregular; tube campanulate or turbinate; limb erect or rotate; lobes subequal, posterior outside in bud, rounded, ovate or oblong, pilose on inner face. **Stamens** 4, mostly somewhat didynamous, in mouth of corolla tube or shortly exserted; filaments filiform, arising ± in middle of corolla tube, filaments of lower stamens often crossing those immediately above them at right angles; anthers with 2 equal, confluent thecae. **Ovary** bilocular, at least near base, globose or elliptical; ovules many; style varying in length, terete, sometimes incurved, included or exserted; stigma capitate. **Fruit** an ovoid to ± spherical capsule, almost indehiscent or at length loculicidal; valves entire. **Seeds** many, subglobose, 4-sided, or oblong; testa thin, brown, ribbed or reticulate. $x = 10$ (9—1 report) (polyploidy).

Species ± 11, cosmopolitan, mainly in temperate and cooler regions but also in tropical mountains; ± 8 in sthn Afr., widespread but not in Swaziland.

*Linaria Mill. 7480000

Miller: [791] (1754); Hiern: 203 (1904); Chater *et al.*: 226 (1972); Wells *et al.*: 332 (1986); Sutton: 260, 272 (1988).

Annual or perennial herbs. **Leaves** usually verticillate below, alternate above, narrow, sessile, entire. **Flowers** in terminal, bracteate racemes or spikes, rarely solitary in leaf axils. **Calyx** deeply 5-lobed, equal or unequal, posterior lobe usually longest, very rarely shortest. **Corolla** tubular, bilabiate, 5-lobed, usually glabrous except for palate; tube ± cylindrical, with conical or cylindrical spur on anterior side at base; lips ± equal, posterior lip 2-lobed, ± patent, exterior in bud; anterior lip 3-lobed, spreading to patent with prominent, pubescent basal palate occluding corolla mouth, or only partly so. **Stamens** 4, didynamous, included, adjacent pairs of anthers marginally coherent; filaments filiform; anthers bithecate; thecae oblong, parallel; staminode minute. **Ovary** equally or unequally bilocular; ovules many; style simple or bifid; stigma various. **Fruit** an oblong, ovoid or globose capsule, walls papery, septum erect, straight; locules dehiscing by several irregular, meridional fissures from apex towards base. **Seeds** oblong-orbicular to suborbicular, winged, tuberculate. $x = 6$ (7, 9, 13) (B-chromosomes—1 report, polyploidy).

Species ± 150, temperate Europe, Asia (not SE) and North Africa; widely naturalised in temperate regions; 1 in sthn Afr.: **Linaria vulgaris* Mill., scattered as a weed mainly in eastern half (Gauteng, Mpumalanga, Free State, KwaZulu-Natal, Western and Eastern Cape); others occur as sporadic garden escapes.

Lindernia All. 7562000

Allioni: 178, t. 5, fig. 1 (1766); Merxmüller & Roessler: 28 (1967a); Philcox: 61 (1990); Fischer: 439 (1989); Fischer: 214 (1992); Fischer: 227 (1995); Seine *et al.*: 7 (1995).

Vandellia L.: 12 (1767). *Bonnaya* Link & Otto: t. 11 (1821). *Ilysanthes* Raf.: 13 (1820); Hiern: 364 (1904). *Tittmannia* Rchb.: 27, t. 38 (1824).

Annual or perennial herbs, some aquatic; stems erect to procumbent, simple or branched, quadrangular. **Leaves** opposite, decussate, sometimes in basal rosette, rarely grouped at apex, sessile or petiolate, variously shaped from ovate to linear, entire or somewhat crenate to dentate, rarely floating; venation usually palmate. **Flowers** solitary, axillary, or in terminal racemes, pedicellate or sometimes subsessile; pedicels accrescent, sometimes deflexed in fruit. **Calyx** tubular, 5-lobed; tube ± turbinate at base, somewhat 5-ribbed or -winged; lobes shallow or extending almost to base. **Corolla** tubular, bilabiate; tube cylindrical or somewhat campanulate above; upper lip erect, broad, concave, entire or emarginate to deeply bifid, exterior in bud; lower lip larger, spreading, with 3 broad, subequal, rounded lobes. **Stamens** usually 2 (upper) + 2 staminodes (lower), rarely 4 fertile, didynamous; upper pair arising at top of corolla tube, included in upper lip, with filaments short, straight to arched, linear; lower pair arising ± in corolla throat, with filaments usually longer, recurved or geniculate ± at base, usually with large appendage or swelling there, rarely without, then curving inwards above, sometimes truncate ± at top of appendage; anthers bithecate, free or contiguous; thecae divaricate and often confluent at apex; staminodes 0. **Nectary** disc-like at base of ovary. **Ovary** bilocular, ovoid, oblong or subfusiform; ovules many; style filiform, slightly widening above; stigma shortly bilamellate, lobes stigmatic within, touch-sensitive. **Fruit** an ovoid to long-ellipsoid, septicidal capsule. **Seeds** many, ovoid, elliptical or cylindrical; testa with thin-walled epidermis cells; endosperm alveolate or sometimes smooth and somewhat furrowed or ridged. $x = 9$ (7, 8, 10, 11, 12, 13, 15) (polyploidy).

Species ± 80, tropical to warm temperate, Europe, mainly Africa; 7 in sthn Afr., all areas except Northern Cape, but mainly eastern half of country; damp areas: swamps, rivers, pans and ephemeral rock pool edges, or aquatic in such pools.

Lyperia Benth. 7518010

Bentham: 377 (1836a); Bentham: 357 (1846); Hilliard: 212 (1994).

Mostly annual herbs, 1 species perennial, markedly glandular; stems leafy throughout, glandular-pubescent, narrowly winged by decurrent leaf bases. **Leaves** mostly opposite, sometimes opposite to alternate, rarely pseudofascicled, usually ± elliptical, rarely oblanceolate or oblong-elliptical, petiolate to subsessile, entire to toothed, bases decurrent forming ridges or narrow wings down stem, mostly pubescent on both surfaces. **Flowers** solitary in axils of upper leaves or bracts, forming a terminal raceme. **Bracts** alternate, leaf-like, adnate to extreme base of pedicel. **Calyx** obscurely bilabiate, 5-lobed almost to base. **Corolla** nearly regular, 5-lobed; tube narrowly cylindrical, ± abruptly dilated in throat, pubescent outside, throat with band or 2 patches of unicellular, clavate hairs inside; lobes rotate or reflexed, minutely glandular around mouth and just inside throat; posterior lobes exterior in bud. **Stamens** 4 or 2 + 2 staminodes (anterior), sometimes with a minute head containing a few pollen grains, didynamous; posterior filaments arising near top of corolla tube, decurrent to base of tube forming a channel for the style; anterior pair arising in throat, exceeding posterior pair, included or just visible in throat; anthers synthecate, dorsifixed. **Nectary** lateral, very small, completely adnate to ovary base. **Ovary** bilocular, cuneate, tapering into style, glandular-pubescent, often also densely clad in glistening glands; ovules many per locule; style long, filiform; stigma very short, broadly hastate with 2 lateral, sticky, receptive surfaces, or narrowly hastate and clad all round in stigmatic papillae, either included or very shortly exserted. **Fruit** a somewhat beaked, relatively large, septicidal capsule with a short, longitudinal split at tip of each valve, conspicuously glandular. **Seeds** many, ± elliptical, black, rarely with pale terminal wings; testa thin, tightly investing endosperm, which has 6–8 longitudinal rows of transversely elongated pits in chequer-board pattern (bothrospermous). $x = 6, 7$ (polyploidy).

Species 6, Namibia, Northern Cape (Namaqualand) and Western Cape (from Ganab south to the Cape Peninsula and east to near Uniondale).

Manulea L. 7517000

Linnaeus: 12 (1767) name conserved; Bentham: 381 (1836a); Bentham: 363 (1876); Hiern: 221 (1904); Merxmüller & Roessler: 29 (1967a); Greuter *et al.*: 298 (1994); Hilliard: 291 (1994).

Nemia P.J.Bergius: 160 (1767) name rejected. *Lychnidia* Moench: 160 (1802).

Annual or perennial herbs, sometimes shrubs; stems leafy throughout or mostly at base, usually pubescent, often with both glandular and eglandular hairs, the latter often with a much inflated apical cell. **Leaves** usually opposite, bases connate, sometimes alternate, all radical or radical and cauline, entire to variously toothed or lobed. **Flowers** in a raceme or thyrse, sometimes panicled. **Bracts** adnate to base of pedicel, often small, sometimes leaf-like. **Calyx** bilabiate; anterior lip 2-lobed, posterior lip 3-lobed; lobes short to long, various in shape, usually pubescent at least on margins. **Corolla** bilabiate or nearly regular, 5-lobed; tube usually narrowly cylindrical, abruptly expanding in upper part, rarely funnel-shaped; mouth usually round, sometimes oblique, rarely laterally compressed; limb: posterior lip 2-lobed, exterior in bud, anterior lip 3-lobed; lobes rotate or reflexed, obtuse to subulate, usually entire, sometimes retuse or once or twice bifid, margins often

revolute, variously pubescent outside, rarely glabrous, inside usually with 1–5 longitudinal, or 1 transverse, bands of unicellular clavate hairs in throat, these hairs sometimes also around mouth or on upper surface of lobes. **Stamens** usually 4, 2, or 2 + 1 or 2 staminodes, didynamous; posterior pair arising in upper half of corolla tube, always included, with filaments not decurrent down tube, often bearded with unicellular clavate hairs, anthers vertical, often cohering; anterior pair arising just below mouth, exceeding posterior pair, anthers usually smaller, ± oblique, included or just visible in mouth; anthers synthecate, dorsifixed. **Nectary** basal on shorter side of ovary. **Ovary** bilocular, elliptical or cuneate, base slightly oblique, glabrous (except for glistening glands sometimes on sutures); ovules many per locule; stigma lingulate with 2 marginal bands of stigmatic papillae, exserted or included. **Fruit** a septicidal capsule, usually glabrous, rarely minutely glandular-puberulous; valves with a short loculicidal split at tip. **Seeds** ± pyriform to elliptical; testa thin, white to violet-blue, tightly investing bothrospermous endosperm, having several longitudinal rows of transversely elongated pits in chequerboard pattern. $x = 8$ (9 - 1 report).

Species 74, Africa, 1 in India, rest in sthn Afr., in all areas but most in Western Cape, gradually fewer species north- and eastwards; extending into Mozambique, Zimbabwe and Angola.

Manuleopsis Thell. 7497020

Thellung: 405 (1915); Merxmüller & Roessler: 33 (1967a); Hilliard: 78 (1994).

Freyliniopsis Engl.: 609 (1922); Merxmüller & Roessler: 33 (1967a).

Large foetid shrubs with whitish bark; branches usually somewhat curved, brittle, ribbed by decurrent leaf bases when young, glandular-puberulous on uppermost parts. **Leaves** opposite and decussate, sometimes fascicled, lanceolate, acute; base tapering into petiole, subentire to serrate, base of petiole persistent, decurrent down stem in 2 narrow ridges, glandular-puberulous. **Flowers** pedicellate, 1–many in axils of leaves or bracts, forming a terminal thyrse. **Calyx** obscurely bilabiate, 5-lobed nearly to base, glandular-puberulous. **Corolla** bilabiate, 5-lobed, persistent; tube narrowly funnel-shaped or subcylindrical, mouth laterally compressed, elliptical, posterior side of tube with band of unicellular clavate hairs from mouth to base; posterior lip 2-lobed, exterior in bud; anterior 3-lobed; lobes spreading, suborbicular, glandular-puberulous outside, inside minutely glandular around mouth. **Stamens** 4, didynamous; posterior ones included, with filaments decurrent to base of tube; anterior ones arising in throat, exceeding posterior pair, very shortly exserted; anthers synthecate, dorsifixed, thecae transversely kidney-shaped. **Nectary** not conspicuous, possibly very shallowly annular. **Ovary** bilocular, deltoid, glabrous; ovules many per locule; stigma bifid, just reaching mouth. **Fruit** a septicidal capsule, each valve with a short loculicidal split at tip. **Seeds** ± ellipsoid, brown; testa thin, reticulate.

Monotypic: *Manuleopsis dinteri* Thell., Namibia from Kaokoveld, Otavi and Tsumeb south to the Naukluft Mountains and due east ± 150 km to Kalkrand.

Melanospermum Hilliard 7522010

Hilliard: 482 (1989); Hilliard: 387 (1994).

Phyllopodium Benth. in part; Hiern: 317 (1904); *Polycarena* Benth. in part; Hiern: 327 (1904).

Small annual or perennial herbs; stems leafy, pubescence usually patent, rarely ± retrorse, hairs gland-tipped or not. **Leaves** opposite, occasionally alternate below inflorescence, rarely radical, usually elliptical to ovate, stem leaves usually narrower than basal ones and sometimes linear to narrowly oblanceolate, mostly petiolate, at times merely narrowed at base, usually few-toothed to serrate in upper half, sometimes entire, usually somewhat pubescent. **Flowers** usually shortly pedicellate, axillary, in racemose inflorescences, elongate or capitate, always erect. **Bracts** sometimes leaf-like, longer than broad, adnate to pedicel only, or sometimes to extreme base of calyx as well. **Calyx** bilabiate, membranous; tube shorter than anterior lip which is deeply to shallowly divided. **Corolla** bilabiate, membranous, persistent; tube glabrous outside but backs of lobes sometimes glandular-puberulous; posterior lip 2-lobed, exterior in bud, base of lip with orange/yellow patch or two posterior lobes wholly orange and there either glabrous or bearded with clavate hairs; anterior lip 3-lobed; lobes entire. **Stamens** 4, all exserted or 2 in throat and 2 exserted; anterior pair exceeding posterior pair; posterior filaments decurrent to base of corolla tube; anthers synthecate, dorsifixed; staminodes 0. **Nectary** small, on shorter side of ovary. **Ovary** bilocular, elliptical, base slightly oblique, glandular-puberulous or glabrous on upper part; ovules many per locule; style filiform, passing gradually into flattened, lingulate stigma with two marginal bands of stigmatic papillae, exserted. **Fruit** a septicidal capsule with a short loculicidal split at tip of each valve. **Seeds** elliptic-oblong, black, on a round, centrally depressed cushion with irregular margins; testa tightly investing endosperm, coarsely and deeply reticulate (3–8 round pits in each longitudinal band).

Species 6, sthn Afr., in all northern areas including northernmost Free State and KwaZulu-Natal, not in Lesotho or the Cape provinces; also in W Zimbabwe; usually under out-cropping rocks, sometimes in open sand.

Melasma P.J.Bergius 7597000

Bergius: 162, t. 3, f. 5 (1767); Hiern: 371 (1904) in part (mixed with *Alectra*); Hemsley & Skan: 361 (1906); Melchior: 199 (1940); Visser: 82, 155, tt. 123–128 (1981); Philcox: 82 (1990).

Erect or ascending perennial herbs, hemiparasitic; stems ± simple or branched, leafy, coarse, hispid-scabrid. **Leaves** opposite, sometimes alternate in inflorescence, narrowly-oblong or lanceolate, subentire to dentate, sometimes shortly lobed, sessile or subsessile. **Flowers** solitary in axils of upper leaves or bracts, usually in lax terminal racemes, long-pedicellate, bibracteolate, white, pale yellow or brown with dark tube and throat. **Bracts** leaf-like, becoming small above; bracteoles in upper half or third of pedicel but well below calyx. **Calyx** large, campanulate-oblong, loose, somewhat angled, 5-dentate, 10-ribbed, accrescent, inflated and dry in fruit; lobes erect, subequal, valvate, broadly deltate. **Corolla** tubular-campanulate, 5-lobed, much longer than calyx, early deciduous; tube ± funnel-shaped; lobes imbricate, posterior ones interior in bud, widely spreading, rounded, shorter than tube. **Stamens** 4, didynamous or ± equal, arising near base of corolla tube, included; filaments linear, pilose; anthers bithecate; thecae ± equal, parallel, apiculate or acuminate. **Nectary** annular, fleshy. **Ovary** bilocular, ovoid, glabrous; ovules many on thick, fleshy placenta; style terete, curved near apex; stigma clavate or thickened and terete, persistent, exserted from calyx. **Fruit** a broadly ellipsoid to subovoid, loculicidal capsule, included in calyx. **Seeds** very many, conical, straight or curved, truncate; testa loose, reticulate, transparent, extended each end beyond seed nucleus.

Species 5, America, Africa; 1 in sthn Afr.: *Melasma scabrum* P.J.Bergius, Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho and Eastern Cape; vleis, marshes and riversides.

Microdon Choisy 7569000

Choisy: 97 (1823); Rolfe: 175 (1901); Hilliard: 318 (1990); Hilliard: 1 (1999).

Agathelpis Choisy: 85 (1823); Rolfe: 178 (1901); Hartley & Balkwill: 471 (1990); Hilliard: 318 (1990).

Small, perennial, much-branched, heath-like shrublets, without brachyblasts (dwarf shoots); hairs on main parts (not inside corolla tube) sculptured. **Leaves** alternate (± spiralled), linear to suborbicular, sessile, dense, sometimes fascicled. **Flowers** small, sessile, bracteate, in many-flowered, ovate to ± elongated, lax or compact spikes. **Bracts** adnate to at least part of calyx tube, sometimes large and spreading, ovate or oblong to suborbicular, glabrous. **Calyx** tubular, ± equally 5-dentate; tube campanulate or cylindrical, 5-ribbed (vascular strands), subglabrous; lobes much shorter than tube, anterior teeth sometimes more deeply incised than other 3. **Corolla** tubular, sub-bilabiate, 5-lobed, leathery, glabrous; tube ± cylindrical or slightly enlarged at throat and/or curved; longer than lobes; limb spreading; upper lip 2-lobed with lobes partly fused, orange patch sometimes present, glabrous, exterior in bud; lower lip 3-lobed; lobes subequal, oblong or linear-oblong. **Stamens** 4 or 2, if 4 then didynamous with upper pair arising in corolla mouth, ± exserted, and lower pair in corolla tube, included, if 2 then arising above middle of tube, fused almost to full length of corolla tube with free portion of filaments shorter than anthers, usually included or just emerging at throat; filaments linear; anthers short, synthecate, dorsifixed; staminodes 0. **Nectary** small, at base of ovary on posterior side. **Ovary** cylindrical, unilocular by abortion, sometimes apparently unequally bilocular with posterior locule smaller and ovule abortive; ovule 1; style filiform, entire; stigma lingulate with marginal stigmatic papillae, sometimes exserted. **Fruit** a single, semi-ovoid, oblong or narrowly oblong, 1-seeded, indehiscent coccus enclosed within persistent bract and calyx, sometimes with second, smaller, membranous, empty coccus adherent to the first. **Seeds** probably fusiform.

Species 8; Northern Cape (Kamiesberg and Calvinia) and Western Cape, mostly southwestern area from Vanrhynsdorp to Ladismith.

Mimulus L. 7524000

Linnaeus: 634 (1753); Hiern: 354 (1904); Grant: 99, t. 9 (1924); Webb: 204 (1972); Philcox: 36 (1990).

Perennial herbs, stoloniferous or with moniliform rootstock; stems erect, ascending, decumbent or creeping and then rooting at lower nodes, terete or quadrangular with angles winged, glabrous or viscid-villous. **Leaves** opposite, linear-oblong, lanceolate or ovate, clasping at broad base or subauriculate to subtruncate, sessile or shortly petiolate, entire or denticulate, 1-veined or pinnately veined. **Flowers** axillary, pedicellate, in loose terminal, leafy racemes or solitary; bracts 0. **Calyx** tubular, 5-angled, often 5-ribbed, ± plicate, 5-toothed; tube cylindrical or campanulate; lobes deltoid-lanceolate or lanceolate, acute or subulate. **Corolla** bilabiate or funnelform, if bilabiate then tube and throat broad, almost closed by palate; lips unequal, shorter then tube, posterior one 2-lobed, erect, exterior in bud; longer anterior one 3-lobed, spreading, with hairy palate at base; lobes rounded or subtruncate; if corolla funnelform then tube with throat short and open; lobes subequal. **Stamens** 4, didynamous, included; filaments glabrous, arising near base of corolla tube; anthers bithecate with thecae at length confluent at apex or coherent nearly to base, glabrous or pubescent; staminodes 0. **Ovary** bilocular, oblong or ovoid; ovules many; style filiform, glabrous, included; stigma bifid, lobes broad, rounded, equal, fimbriate or laciniate, touch-sensitive. **Fruit** an oblong or ovoid, loculicidal capsule, included. **Seeds** many, oblong or oval, reticulate or tuberculate. $x = 7, 8$ (9, 10, 12, 13, 15, 23) (aneuploids, high polyploidy, B-chromosomes—1 report).

Species 150, widespread, mostly temperate America, also in tropical Africa, India and Australia; 2 in sthn Afr.: *Mimulus gracilis* R.Br., in all areas except Western Cape, and **M. moschatus* Douglas ex Lindl., possibly escaped from cultivation in E Free State and KwaZulu-Natal; in moist places.

**Misopates* Raf. 7482010

Rafinesque: 158 (1840); Pennell: 95 (1921); Webb: 224 (1972); Sutton: 145, microfiche: 97 (1988); Philcox: 14 (1990).

Antirrhinum L., Hiern: 205 (1904); Hemsley & Skan: 287 (1906); Mielcarek: 75 (1996).

Annual herbs; stems simple or branched, erect or ascending, glabrous or glandular-pilose. **Leaves** usually opposite below, becoming alternate above, linear, elliptic or lanceolate, entire, shortly petiolate to sessile, pinnately veined. **Flowers** in terminal, leafy or bracteate racemes, or solitary-axillary, pedicellate. **Calyx** deeply and very unequally 5-lobed, with posterior lobe longest, valvate, equal to or longer than corolla tube. **Corolla** bilabiate, 5-lobed; tube cylindrical or somewhat urceolate, with broad pouch on anterior side at base, wide-mouthed, villous within; lips subequal and erecto-patent, posterior one 2-lobed, exterior in bud; anterior one somewhat longer than posterior, with prominent basal palate occluding mouth of tube, 3-lobed; lobes entire. **Stamens** 4, didynamous, with adjacent pairs of anthers marginally coherent, included; staminode minute. **Ovary** bilocular, ovoid, gibbous; locules unequal; ovules many; style simple, filiform; stigma capitate. **Fruit** an ovoid to oblong, leathery, glandular-pubescent capsule; septum erect, sinuate; posterior locule dehiscing by single apical pore with irregular teeth, anterior one by 2 such pores. **Seeds** somewhat flattened, dorsal face convex, ± smooth, usually keeled, margin produced into a narrow wing; ventral face flat, finely tuberculate, with a wide, papillate border or rarely wing parallel to margin. $x = 7, 8$ (6, 15) (polyploidy).

Species 3, from Mediterranean to northwest India; 1 in sthn Afr.: **Misopates orontium* (L.) Raf., introduced from S Europe and North Africa, occurs sporadically as weed of cultivation in KwaZulu-Natal and Western and Eastern Cape; also in tropical Africa, Atlantic islands, Haiti, India, and Australia.

Nemesia Vent. 7476000

Ventenat: 41, t. 41 (1804); Hiern: 169 (1904); Diels: 121 (1910); Merxmüller & Roessler: 34 (1967a); Hilliard & Burtt: 385 (1986b); Steiner: 405 (1989b); Philcox: 9 (1990); Steiner: 63 (1996).

Annual or perennial herbs or undershrubs, sprawling to erect; stems often quadrangular and branched from base, glabrous or pubescent. **Leaves** mostly opposite, sometimes alternate above, linear or lanceolate to ovate, entire or toothed, sessile or petiolate. **Flowers** solitary-axillary or in terminal racemes, bracteate, pedicellate, often alternate. **Bracts** sometimes leafy. **Calyx** 5-lobed, somewhat accrescent in fruit. **Corolla** bilabiate, personate, 5-lobed; tube short, extended at front into a dependent spur, pocket or pouch; posterior lip 4-lobed, exterior in bud, with laterals outside both posteriormost lobes and anterior lip; anterior lip 1-lobed, entire or emarginate, with a convex, sometimes papillate palate at its base. **Stamens** 4, didynamous, arising in mouth of corolla tube; filaments linear, anterior pair usually bent at base round posterior pair and coming to be in posterior position, usually appendaged at base; anthers usually

cohering in pairs about stigma; thecae confluent. **Ovary** bilocular, usually elliptical; ovules many; style short, thick and terete or filiform; stigma simple or bilobed. **Fruit** a septicidal capsule, usually ovate to urceolate, somewhat laterally compressed; apex rounded to emarginate; valves boat-shaped. **Seeds** many in 1 or 2 series, usually ± ellipsoid, more rarely spindle-shaped; wing membranous, entire or interrupted. $x = 9$ (10—1 report, aneuploids).

Species ± 65, Africa; tropical (few) and sthn Afr.; ± 60 in sthn Afr., in all provinces but mostly in Western Cape.

Oftia Adans. 7494010

Adanson: 199 (1763); Rolfe: 93 (1901) under Myoporineae; Dahlgren & Rao: 451 (1971) under Scrophulariaceae; Takhtajan: 458 (1997) under Oftiaceae.

Dwarf shrubs or shrubs, glabrous, villous or sometimes viscid-pubescent; branches decumbent to ascending. **Leaves** usually opposite or somewhat verticillate in basal parts, sometimes alternate above, closely set, sessile or with narrowed base, margins revolute and variously closely dentate or serrate, bases ± decurrent into ridges on young stems. **Flowers** solitary in axils of upper leaves, pedicellate or subsessile, sometimes bracteolate; axis may continue to grow after flowering. **Calyx** deeply and ± regularly 5-lobed; lobes linear to subulate with stalked glands or glabrous. **Corolla** 5-lobed and ± regular; tube cylindrical, often a little dilated at throat, villous inside in upper half; lobes much shorter than tube, subequal, imbricate, posterior lobes exterior in bud. **Stamens** 4, subequal, included; filaments short, filiform, arising ± in middle of corolla tube; anthers bithecate, narrowly oblong; thecae parallel. **Nectary** 0. **Ovary** bilocular, with usually 4 pendulous ovules in each locule; style short, well included; stigma somewhat thickened, oblique. **Fruit** a small, globose, succulent drupe. **Seeds** hard, somewhat rugose.

Species 3, sthn Afr., Northern Cape (Namaqualand) southwards to Western Cape (about Gansbaai) and east along mountains to Riversdale, and perhaps to Eastern Cape (Uitenhage).

*__Orobanche__ L. 7791000

Linnaeus: 632 (1753); Hiern & Stapf: 421 (1904); Stapf: 464 (1906); Henderson & Anderson: 302 (1966); Roessler: 132 (1968); Visser: 131, 164, figs 215–220 (1981) under Orobanchaceae; Minkin & Eshbaugh: 1 (1989); Philcox: 160 (1990); Brummitt: 306 (1992) under Scrophulariaceae; Kreutz: 44, 120 (1995); Mabberley: 511 (1997) under Orobanchaceae; Takhtajan: 458 (1997) under Scrophulariaceae.

Holoparasitic, annual herbs attached to roots, lacking chlorophyll, variously coloured, usually ± covered with gland-tipped papillose hairs; stems solitary or fascicled, simple or branched usually from base, fleshy but slender. **Leaves** alternate, mostly scale-like, upper ones sometimes bract-like, sometimes crowded near base, distant higher up. **Flowers** irregular, solitary in axils of upper scales or bracts, bracteolate or not, sessile or lowest ones pedicelled, usually in many-flowered spikes or racemes, at length elongated and lax. **Calyx** tubular, (2)4-lobed, membranous, shorter than corolla tube; tube campanulate with 4 lobes arising ± in middle, or divided to base at front and back into 2 subequal, usually 2-lobed parts. **Corolla** tubular, ± distinctly bilabiate, 4- or 5-lobed, marcescent; tube somewhat constricted near base or at middle, usually ± funnel-shaped above, gently curved; upper lip 2-lobed or emarginate, porrect, interior in bud; lower lip 3-lobed; lobes equal or subequal, ± rounded, separated by prominent folds. **Stamens** 4, didynamous, arising low down in corolla tube, ± included; filaments usually thickened or flattened towards base and surrounded by a luniform gland above point of attachment, glabrous or ± hairy at least below; anthers often cohering below stigma, bithecate; thecae usually equal, all fertile, parallel or slightly divergent, mucronate at base; staminodes 0. **Nectary** obscure. **Ovary** unilocular, ovoid-ellipsoid; ovules many on 4 parietal placentas; style thick and somewhat flattened, included, persistent; stigma fleshy, 2–4-lobed, sometimes obscurely so, lobes papillose above. **Fruit** a bivalved, loculicidal, capsule. **Seeds** very many, minute, subglobose, testa reticulate, membranous. $x = 19$ (12) (aneuploids, high polyploidy).

Species 150, ± cosmopolitan, temperate and warm, especially North; 2 in sthn Afr.: **Orobanche ramosa* L. and **O. minor* Sm.; introduced weeds, sporadic in Namibia, Gauteng, Mpumalanga, Northern, Western and Eastern Cape, potentially major pests of cultivated plants.

Peliostomum Benth. 7468000

Bentham: t. 1882 (1836d); Hiern: 132 (1904); Weber: 1, 80, t. 3 (1907); Phillips: 22 (1950) under *Aptosimum*; Roessler: 9 (1966); Merxmüller & Roessler: 37 (1967a).

Low undershrubs, sometimes flowering in herbaceous state; branches slender, usually fairly stiffly erect, longitudinally striated from decurrent leaf bases, sometimes viscid. **Leaves** alternate, crowded or scattered, linear, elongated, elliptical, ovate or obovate, sessile to shortly petiolate, entire, 1-nerved, ± densely or sparsely papillose, almost glabrous or finely glandular-tomentose. **Flowers** solitary in leaf axils, very shortly pedicellate with 2 small bracteoles at base, dark blue to violet. **Calyx** divided almost to base, 5-lobed, ± valvate; lobes linear, narrow, acute. **Corolla** tubular, weakly irregular, 5-lobed, much longer than calyx; tube elongated, narrow below then widening suddenly, throat long, mouth wide; lobes ± equal, free, rounded, spreading, shorter than tube, posterior pair outside in bud. **Stamens** 4, didynamous, included, arising in lower part of corolla tube; filaments filiform; anthers of equal size, all fertile, transverse, usually ciliate; thecae confluent. **Ovary** bilocular, ± narrowly ovate; ovules many; style filiform, exceeding stamens; stigma small, entire, emarginate or slightly bilobed. **Fruit** a thin-walled capsule, narrowly elongate-ovoid, acute, acuminate or obtusely pointed, somewhat compressed at right angles to septum, bisulcate over septum, longer than calyx, septicidally bivalved, opening ± to base; valves deeply bilobed. **Seeds** rugose or scrobiculate-tuberculate.

Species ± 5, Africa; most in sthn Afr., widespread, but mostly in western, dry regions; not in Gauteng or Lesotho.

There has been much controversy over separation of *Aptosimum* and *Peliostomum* (see Phillips 1950, Roessler 1966 & Philcox 1990). Here Merxmüller & Roessler (1967a) have been followed. Using the key above, 2 species, *A. lugardiae* (N.E.Br.) E.Phillips and *A. junceum* (Hiern) Philcox, will key out under *Peliostomum* because of the fruit type. These species would appear to be better placed there. They can be distinguished because *A. lugardiae* has the corolla tube expanding within the calyx, lower down than in current *Peliostomum* species, and *A. junceum* has almost leafless branches.

Phygelius E.Mey. ex Benth. 7495000

Bentham: 53 (1836c); Hiern: 212 (1904).

Robust undershrubs, ± glabrous except for puberulous inflorescence; branches narrowly 4-winged by decurrence of petioles. **Leaves** opposite, petiolate, ovate to lanceolate, crenulate-serrulate, sometimes biauriculate at base. **Flowers** many, pendulous, pedicellate, in axils of bracts, grouped in terminal, secund, paniculate cymes. **Calyx** tubular, 5-partite, much shorter than corolla tube, chartaceous; tube short; lobes imbricate. **Corolla** tubular, irregular or subregular, 5-lobed, trumpet-shaped; tube long, incurved or ± straight; limb strongly oblique

or ± equal; lobes short, obtuse, subequal, ± spreading, with stalked glands on inner face and margin; 2 posterior lobes exterior in bud. **Stamens** 4, didynamous, glabrous, exserted; filaments thickish, linear; arising a third to halfway down corolla tube; anthers erect, bithecate, with parallel thecae; connective thick; staminode obsolete. **Ovary** bilocular, ovoid; ovules many; style terete, glabrous, becoming long-exserted; stigma shortly bifid or subcapitate. **Fruit** an ovoid, ± oblique, septicidal capsule, with entire valves. **Seeds** subovoid, bluntly angular, subreticulately veined, minutely papillose; testa rather thickly spongy.

Species 2, sthn Afr., widespread, but not in Western Cape.

Phyllopodium Benth. 7521000

Bentham: 372 (1836a); Bentham: 352 (1846); Bentham: 944 (1876); Hiern: 311 (1904) in part; Hilliard & Burtt: 161 (1977) excl. *Polycarena transvaalensis* Hiern; Hilliard: 429 (1994).

Polycarena Benth. in part; Hiern: 325 (1904). *Selago* L. in part; Rolfe: 160 (1901).

Small, annual or perennial herbs; stems leafy throughout or ± nude above, pubescence mainly eglandular with hairs retrorse or sometimes patent, sometimes some patent, gland-tipped hairs present as well but not dominant. **Leaves** opposite below, alternate above, sometimes pseudofasciculate or crowded at base, variously shaped but often elliptical to ovate, usually petiolate, entire to serrate, usually pubescent to some extent, at times glandular punctate. **Flowers** in racemes, elongate or capitate, always erect. **Bracts** adnate to pedicel and at least halfway up calyx tube, patent, eglandular hairs always present at least on lower margins. **Calyx** usually tubular, distinctly or obscurely bilabiate, 5-lobed mostly halfway or more to base, rarely calyx incompletely tubular with 3 posterior lobes free to base and 2 anterior ones joined to ± halfway, that is, the part where bract is adnate to calyx; membranous. **Corolla** bilabiate, membranous, persistent; tube cylindrical to narrowly funnel-shaped, usually glabrous outside, rarely pubescent; posterior lip 2-lobed, exterior in bud, sometimes with an orange/yellow patch at base, there either glabrous or bearded with unicellular clavate hairs; anterior lip 3-lobed; lobes entire. **Stamens** usually 4, didynamous, rarely 2, or sometimes reduced to 2 or 3 in self-fertilised flowers, well exserted in chasmogamous flowers; posterior filaments decurrent at least halfway down corolla tube; anterior pair exceeding posterior pair; anthers synthecate, dorsifixed. **Nectary** at base of ovary on shorter side. **Ovary** bilocular, elliptical, usually glabrous; ovules few to many per locule; style filiform, passing gradually into lingulate stigma with two marginal bands of stigmatic papillae. **Fruit** a septicidal capsule with a short loculicidal split at tip of each valve. **Seeds** elliptic or angled, mostly colliculate and ± wrinkled as well, sometimes smooth, ± opaque, pale amber, creamy, greyish, mauvish, bluish or dark blue-grey, not winged; testa tightly investing endosperm. $x = 6$.

Species 26, sthn Afr., Namibia, in South Africa mainly in Northern Cape (Namaqualand, but only 7 species N of Kamiesberg) and Western Cape (southwestern part to ± 20°E), only 8 species occur further east, 2 reaching Durban (KwaZulu-Natal).

Polycarena Benth. 7522000

Bentham: 371 (1836a); Bentham: 350 (1846); Hiern: 321 (1904) in part; Hilliard & Burtt: 161 (1977) excl. *P. capillaris* (L.f.) Benth.; Hilliard: 395 (1994).

Annual herbs; stems leafy, pubescence always patent, hairs gland-tipped. **Leaves** opposite below, alternate above, rarely rosulate, mostly linear to oblanceolate, sometimes spathulate or elliptical, rarely ovate, entire or few-toothed, usually glandular-pubescent, rarely glabrous. **Flowers** in racemes, sometimes congested, always erect. **Bracts** not sharply differentiated from leaves, adnate to pedicel and calyx, only anterior lobes and sometimes uppermost part of tube free. **Calyx** tubular, (4)5-lobed, bilabiate, membranous, slightly accrescent; lobes often shallow or shorter than sinus between lips; rarely anterior lip entire. **Corolla** tubular, usually bilabiate, rarely regular; membranous, persistent; tube glabrous or pubescent outside; posterior lip usually 2-lobed, exterior in bud; anterior lip usually 3-lobed; lobes entire, often ± equal, throat usually with orange/yellow patch at base of posterior lip or all round mouth and there either bearded with clavate hairs or sometimes glabrous. **Stamens** 4, ± didynamous, sometimes reduced to 2, or 3, or 1 in chasmogamous flowers, arising in throat of corolla tube; anterior pair exceeding posterior pair; either all exserted or anterior pair well exserted, posterior pair just visible in mouth; posterior filaments decurrent down tube in most species; anthers synthecate, dorsifixed. **Nectary** adnate to base of ovary on shorter side. **Ovary** bilocular, elliptical, glandular-puberulous on upper part; ovules few to many per locule; style filiform, passing gradually into lingulate stigma with two marginal bands of stigmatic papillae, exserted. **Fruit** a septicidal capsule with a short loculicidal split at top of each valve, glandular-puberulous at apex. **Seeds** 4–40 per locule, usually strongly, sometimes weakly, 3-winged or 3-angled; buff-coloured; testa delicate, translucent, loosely enveloping endosperm. $x = 7$ (1 report).

Species 17, sthn Afr., W Northern Cape (only 4 species ranging north of Vanrhynsdorp, 1 to Richtersveld) and Western Cape, mostly in south, west of Laingsburg, 1 eastward to Oudtshoorn.

Pseudoselago Hilliard 7568060

Hilliard: 243 (1995a); Hilliard: 315 (1990) under *Selago* section Spureae; Hilliard: 1 (1999).

Annual or perennial herbs or subshrubs; stems erect, decumbent or prostrate, sometimes with axillary leaf tufts (incipient branches, not leaf fascicles), usually winged or ridged by decurrent leaf bases; hairs on main parts (not inside corolla tube) thin-walled. **Leaves** opposite, and then bases sometimes connate, usually becoming alternate upwards, variously shaped between broadly ovate and linear, oblanceolate and spathulate, rarely rhomboid, bases usually narrowed but rarely petiolate, usually dentate in upper half, often glandular-punctate, somewhat pubescent or glabrous, rarely villous. **Flowers** small, sessile, bracteate, in a spike, or several forming a corymb or narrow panicle. **Bracts** adnate to calyx tube, base often inflated, usually indurated with age, persistent. **Calyx** deeply 5-lobed, more than halfway, posterior lobe shortest, lobes narrowly triangular, usually becoming indurated with age. **Corolla** tubular, bilabiate, 5-lobed; tube funnel-shaped or cylindrical, glabrous outside; posterior lip usually 2-lobed, sometimes apparently 4-lobed when lateral lobes of anterior lip are ascending, exterior in bud, with yellow/orange (perhaps sometimes white) patch at base and briefly extending down back of throat, bearded there with 1-celled, clavate hairs, these sometimes extending to the usually 3-lobed, sometimes apparently simple, anterior lip. **Stamens** 4, didynamous, arising near top of corolla tube; posterior filaments usually decurrent down tube; anthers synthecate, dorsifixed, posterior ones either exserted or held in mouth, anterior ones exserted, rarely included. **Nectary** small, adnate on posterior side of ovary. **Ovary** bilocular, elliptical-oblong, base slightly oblique; 1 pendulous ovule per locule; style filiform, merging imperceptibly into lingu-

late stigma with marginal bands of stigmatic papillae. **Fruit** a pair of soft-walled cocci, convex on outer face. **Seeds** elliptical, compressed, convex on one face, ± plane on the other, smooth or rugulose.

Species 28, sthn Afr., mainly southwestern areas of Western Cape, extending into Northern Cape (Calvinia) and Eastern Cape (Humansdorp).

Reyemia Hilliard 7523010

Hilliard: 297 (1992); Hilliard: 522 (1994).

Zaluzianskya F.W.Schmidt in part; Hiern: 353 (1904).

Small annual herbs; stems laxly leafy, often with axillary leaf tufts (incipient branches), glandular above, with retrorse, eglandular hairs below. **Leaves** opposite below, alternate above, mainly radical, elliptical, tapering into broad petiole or briefly narrowed to base (cauline leaves), entire to sparsely dentate, pubescent on upper surface, glabrous below. **Flowers** in a lax raceme, often panicled. **Bracts** adnate to pedicel and most of calyx tube, usually with coarse, patent eglandular hairs on margins. **Calyx** bilabiate, ± plicate at anthesis; lips short, posterior lip shortly 3-toothed; anterior lip scarcely lobed, membranous; lobes shorter than tube, midrib of each lobe thickened. **Corolla** tubular, bilabiate, 5-lobed, resupinate by curvature of upper part of tube; tube narrowly cylindrical below, widening towards throat; posterior lip 4-lobed, exterior in bud, inclining downwards, bearded with clavate hairs at base and down back of throat; anterior lip entire, erect. **Stamens** 2 (posterior pair); filaments decurrent to base of tube forming a channel enveloping style; anthers synthecate, dorsifixed, well exserted, connective glandular; staminodes 2, small. **Nectary** small, completely adnate to base of ovary on one side. **Ovary** bilocular, oblong-elliptical, glandular or not on sutures; ovules many (more than 20 per locule); style passing gradually into lingulate stigma with two marginal bands of stigmatic papillae, exserted. **Fruit** a septicidal capsule with a short loculicidal split at tip of each apiculate valve. **Seeds** slightly longer than broad, somewhat angled, irregularly colliculate, ± opaque, greyish when young, later pallid; testa tightly investing endosperm.

Species 2: *Reyemia chasmanthiflora* Hilliard and *R. nemesioides* (Diels) Hilliard, Western Cape (Calvinia, Sutherland and Fraserburg Districts).

Rhamphicarpa Benth. emend. Engl. 7624000

Bentham: 368 (1836a); Engler: 361 (1895); Hiern: 398 (1904) in part; Hansen: 103 (1976); Philcox: 135 (1990); Mielcarek: 172 (1996).

Annual herbs, erect, slender, hemiparasitic on roots, turning dark on drying; stems simple or branched, glabrous, smooth. **Leaves** opposite or upper ones alternate, simple and filiform or pinnatisect with filiform segments. **Flowers** axillary or supra-axillary, pedicellate, bracteate and bibracteolate, in terminal racemes. **Bracts** opposite, leaf-like; bracteoles arising from ± middle of pedicel to just below calyx. **Calyx** tubular, 5-cleft or deeply 5-lobed; tube short and wide, campanulate; lobes ovate at base, filiform at tip, valvate in bud. **Corolla** tubular, ± regular, 5-lobed, exserted, long persisting around maturing capsule; tube long, straight or curved, ± cylindrical below, abruptly widening above, with stalked glandular hairs outside; limb spreading; lobes equal or subequal, elliptic or obovate, imbricate, posterior lobes interior in bud. **Stamens** 4, ± equal, arising all at one level in upper part of corolla tube, included; filaments short, linear, bearded at base; anthers erect, dorsifixed, unithecate, without evidence of second theca. **Ovary** bilocular, globose or ovoid; ovules many; style linear, usually ± as long as corolla tube, hence exceeding stamens; stigma lingulate. **Fruit** usually a ± distinctly beaked capsule, vertically somewhat compressed, held erect or oblique, loculicidal along both sutures or rarely one, enclosed in persistent calyx. **Seeds** many, cylindrical or obovoid; testa reticulate, membranous.

Species 6, mostly Africa, some India and Australia; 2 in sthn Afr.: *Rhamphicarpa fistulosa* (Hochst.) Benth. and *R. brevipedicellata* O.J.Hansen, Namibia, Botswana, Northern Province, North-West, Mpumalanga, Swaziland, KwaZulu-Natal; often near rivers and grassy swamps or vleis and pan margins.

*Scoparia L. 7576000

Linnaeus: 116 (1753); Hemsley & Skan: 354 (1906); Philcox: 77 (1990); Mielcarek: 32 (1996).

Annual herbs, or rarely small, woody, perennial subshrubs (*S. dulcis*), erect, fairly robust, much-branched, glabrous or minutely pubescent, especially at nodes; stems slightly angular or ribbed because of decurrent leaf bases. **Leaves** commonly ternate, whorled or opposite, narrowed to petiole-like base, narrowly oblanceolate to elliptic-lanceolate, entire or dentate in upper half, usually narrow, punctate, veins prominent below. **Flowers** small, usually solitary or more rarely paired in axils of leaf-like bracts, sometimes forming branched, many-flowered, raceme-like inflorescences, pedicellate, ebracteolate. **Calyx** deeply 4(5)-lobed; lobes equal or subequal, ovate or oblong, obtuse, imbricate, densely sessile-glandular. **Corolla** regular, rotate, 4(5)-lobed, corolla tube very short, not exceeding calyx tube, throat bearded; lobes obtuse, subequal, bearded in lower part, upper lobes probably outside in bud. **Stamens** 4, subequal, exserted; filaments filiform; anthers subsagittate with 2 divergent or parallel thecae. **Ovary** bilocular, ovoid; ovules many; style subclavate at apex, persistent; stigma truncate or emarginate. **Fruit** a globose or ovoid, septicidal capsule, when partly opened forming a ± round pore at apex; valves ± entire, membranous. **Seeds** many, obovoid, angular, minutely pitted. $x = 10$ (polyploidy).

Species 20; tropical America; 1 in sthn Afr.: **Scoparia dulcis* L., a pantropical weed of cultivation, grazed grasslands and wasteland; sometimes an escape in KwaZulu-Natal (Richards Bay, Inanda and Verulam Districts).

The arrangement of corolla lobes in bud of **Scoparia* is uncertain. Wettstein (1891/1893) and Hemsley & Skan (1906) grouped it with *Veronica* in Digitaleae, which has upper lobes inside in bud. Dyer (1975) placed it in Selaginaceae while Mielcarek (1996) and Takhtajan (1997) put it in subfamily Scrophularioideae, Gratioleae, these taxa having upper lobes outside in bud. The available material precludes checking of this feature.

Selago L. 7568000

Linnaeus: 629 (1753); Bentham: 1128 (1876); Rolfe: 129 (1901); Brenan: 28 (1954); Merxmüller & Roessler: 3 (1967b); Hilliard: 314 (1983); Hilliard: 315 (1990); Philcox: 170 (1990); Hilliard: 1 (1994); Hilliard: 361 (1995b); Hilliard: 277 (1996); Hilliard: 106 (1997); Hilliard: 221 (1998); Hilliard: 1 (1999).

Walafrida E.Mey.: 272 (1838); Rolfe: 116 (1901); Brenan: 28 (1954); Merxmüller & Roessler: 4 (1967b); Hilliard: 315 (1990); Philcox: 165 (1990); Hilliard: 106 (1997).

Shrublets, suffrutices, perennial or rarely annual herbs; stems erect, decumbent or prostrate; hairs on stems, leaves, bracts and calyx with sculptured walls. **Leaves** usually alternate, sometimes opposite near base, and alternate upwards, rarely opposite throughout, often fascicled, small, narrow, oblong, elliptical or spathulate, entire or sometimes toothed. **Flowers** sessile, subsessile, or shortly pedicellate, bracteate, in a spike or raceme, congested or elongated, solitary or aggregated into corymbs or elongate panicles, often elongating in fruit.

Bracts usually adnate to pedicel and calyx tube, sometimes free. **Calyx** tubular, ± regular to irregular, shortly to deeply (2)3–5-lobed; tube broad or narrow; posterior lobe often narrower and/or shorter than others, or lobes sometimes subequal. **Corolla** tubular, usually bilabiate and 5-lobed, rarely 4-lobed and then rotate, without yellow/orange patch; tube often funnel-shaped, sometimes cylindrical, usually glabrous, sometimes pubescent; limb always glabrous inside; posterior lip 2- or 1-lobed, exterior in bud, glabrous; anterior lip 3-lobed; lobes oblong or obovate. **Stamens** usually 4 (2 in 1 species or sometimes 0), didynamous, arising at various depths within corolla tube; filaments subterete or linear, posterior ones decurrent down tube (except in 1 species); anthers synthecate, dorsifixed; posterior ones in throat, mouth, or exserted; anterior ones usually at least shortly exserted (all anthers deeply included in 1 species); staminodes 0–4 (reduction of stamens to staminodes is fairly common, especially in very small flowers, forming functionally female flowers). **Nectary** adnate on posterior side of ovary base. **Ovary** usually bilocular (occasionally unilocular in one species), subglobose or ovoid; ovules 1 per locule, pendulous; style filiform, merging into lingulate stigma with 2 marginal bands of stigmatic papillae. **Fruit** a pair of ± equal, ovate or oblong, hard-walled, indehiscent cocci (rarely with 1 coccus aborted), sometimes held within accrescent calyx, often separating at maturity, rarely held together by common pericarp or fused; cocci convex on outer face, plane on other; pericarp smooth or rugulose. **Seeds** usually cylindrical, sometimes with spurious cells which coalesce, at times, to form cavities. $x = 7$ (1 report).

Species ± 190, few in tropical Afr.; mainly in sthn Afr., widespread, but mostly in Western and Eastern Cape, few in Namibia and Botswana; also in Madagascar.

Sopubia Buch.-Ham. ex D.Don 7616000

Don: 88 (1825); Hiern: 385 (1904); Hansen: 543 (1975); Visser: 82, 158, tt. 153–155 (1981); Philcox: 143 (1990); Mielcarek: 199 (1996); Hofmann & Fischer: 299 (1998).

Annual or perennial herbs or undershrubs, hemiparasitic on roots; stems usually erect, rigid, branched, often ribbed because of decurrent leaf bases, glabrous, scabrid, woolly or tomentose, sometimes in longitudinal bands. **Leaves** opposite or verticillate, or upper alternate, linear to linear-lanceolate, entire or dissected with linear or filiform segments. **Flowers** solitary in axils of bracts, in racemes or spikes; pedicellate or not; bracteoles 2, close to calyx. **Calyx** campanulate or hemispherical, 5-lobed; variously hairy without and within; lobes valvate in bud, linear-triangular to broadly deltate, longer or shorter than tube. **Corolla** usually short, at times exserted, sometimes subrotate, 5-lobed; tube short to very short, subcampanulate, enlarged at throat; limb spreading; lobes broad, elliptical, subequal, entire, longer than tube, 2 upper lobes inside in bud. **Stamens** 4, didynamous, arising in throat of corolla tube, exserted or shortly included; filaments linear; anthers bithecate, all coherent or together in pairs; thecae unequal with one perfect, ovoid or ellipsoid, the other much smaller, linear or clavate, shortly stalked, ± barren. **Ovary** bilocular, subglobose or elliptical; ovules many on thick, planoconvex placentas; style elongated; stigma simple or subclavate. **Fruit** an oblong, ovoid, subglobose or ellipsoid capsule, rounded or compressed and retuse, emarginate or obtuse at apex, loculicidal. **Seeds** subglobose, oblong to obovoid, sometimes linear and curved; testa membranous, reticulate or ribbed, rather loose. $x = 9$.

Species 25–30, Himalayas to Indo-China and Taiwan, tropical Africa; 4 in sthn Afr., widespread but not in Northern Cape.

Stemodiopsis Engl. 7535000

Engler: 25 (1897a); Engler: 497, t. 7, A–F (1897b); Hemsley & Skan: 314 (1906); Philcox: 40 (1990); Mielcarek: 42 (1996); Fischer: 73 (1997a).

Perennial herbs or almost subshrubs, most parts densely and minutely white-pubescent; stems much branched, erect to ascending or procumbent; branches 4-angled, leafy. **Leaves** opposite, ovate, petiolate, acute, cuneate, serrate-dentate. **Flowers** small, axillary, solitary, bracteate; in a lax raceme; pedicels filiform, minutely bibracteolate, decurved in fruit. **Bracts** foliose. **Calyx** 5-partite; lobes ± narrowly triangular, acute, subequal, pilose. **Corolla** tubular, bilabiate, subcampanulate, 5-lobed; tube cylindrical to somewhat dilated at mouth, sparsely pilose to subglabrous outside; upper lip shortly 2-lobed, exterior in bud; lobes triangular-ovate; lower lip somewhat larger, shortly 3-lobed, subcircular, with a distinct palate, minutely pubescent within. **Stamens** 4, perfect, didynamous, arising ± halfway up corolla tube, included in upper lip; all filaments curved inwards but longer anterior ones also bent outwards at base; anthers bithecate; thecae ovoid, equal, confluent at apex, strongly divergent; staminode 1, filiform, arising near base of corolla tube, or 0. **Ovary** bilocular, narrowly conical, attenuate into slender style; ovules many. **Fruit** an ellipsoid-conical, shortly beaked, puberulous, septicidal capsule, turned downwards; valves coherent or connivent at apex after dehiscence. **Seeds** small, many, narrowly oblong, usually somewhat curved, longitudinally ribbed.

Species 5, Africa; 1 in sthn Afr.: *Stemodiopsis rivae* Engl., Northern Province, in rock crevices on Blouberg, Soutpansberg and in northern Kruger National Park; also in Swaziland (Lebombo Mountains).

Striga Lour. 7625000

Loureiro: 22 (1790); Bentham: 968 (1876); Hiern: 379 (1904); Hemsley & Skan: 399 (1906); Wild: 330 (1954); Henderson & Anderson: 290 (1966); Merxmüller & Roessler: 41 (1967a); Visser: 82, 160, tt. 171–184 (1981); Hepper: 127 (1990); Mielcarek: 174 (1996).

Annual or rarely perennial herbs, hemiparasitic or holoparasitic on roots, sometimes drying dark, usually scabrid; stems simple or branched, rarely tufted, erect, sometimes rigid, usually quadrangular, often ridged. **Leaves** opposite or upper ones alternate, sessile or subsessile, usually erect, often scale-like especially near stem base, sometimes throughout, otherwise usually narrow, entire, rarely dentate, usually scabrid. **Flowers** solitary in axils of upper leaves or bracts, spicate, sometimes dense and/or elongating in fruit. **Bracts** leaf-like or reduced; bracteoles 2. **Calyx** tubular, 5-cleft or 5-dentate, 5–15-ribbed; tube cylindrical to campanulate; lobes sometimes unequal, usually erect, sometimes with membranous margins. **Corolla** tubular, usually bilabiate and glandular, 5(4)-lobed; tube narrowly cylindrical, rather sharply bent at or above middle and often dilated there, mouth small, bearded; limb expanded; upper lip erect or recurved, entire (lobes fused), emarginate or bifid, interior in bud; lower lip 3-lobed, usually longer than upper one, spreading. **Stamens** 4, didynamous, arising in upper part of corolla tube, included; filaments linear, short, sometimes shorter than the unithecate, basifixed, erect anthers. **Nectary** present at base of ovary. **Ovary** bilocular, elongated, ellipsoid or ovate; ovules many; style linear or terete, included, usually persistent; stigma somewhat thickened or clavate, sometimes bifid. **Fruit** a cylindrical or subovoid, loculicidal capsule, enclosed in calyx. **Seeds** minute, obovoid or oblong, with prominent encircling ridges; testa reticulate, membranous. $x = 10$ (11, 12) (high polyploidy).

Species ± 40, Africa, Asia, Australia, introduced in N America; ± 7 in sthn Afr., widespread, but mostly in eastern half, not in Western Cape; often pestilential in cereal crops.

Strobilopsis Hilliard & B.L.Burtt 7593020

Hilliard & Burtt: 172 (1977); Hilliard & Burtt: 206 (1989); Hilliard: 532 (1994).

Annual or perennial herbs; stems leafy throughout, narrowly ridged by decurrent leaf bases, pubescent, hairs retrorse and minutely glandular. **Leaves** opposite below, alternate above, narrowly elliptic to linear-oblong, entire or toothed, thick, glandular-punctate. **Flowers** in terminal, capitate inflorescences, solitary or with few to several smaller heads on short, leafy, axillary shoots below main one, globose or oblong-cylindrical, erect, scarcely elongating in fruit. **Bracts** roughly as long as broad, concave, clearly distinct from leaves, adnate to minute pedicel, free from calyx. **Calyx** unequally 5-lobed, thin-textured. **Corolla** tubular, bilabiate, 5-lobed, longer than calyx; tube funnel-shaped, glabrous or very minutely glandular outside; posterior lip 2-lobed, exterior in bud, base with orange patch and clavate hairs; anterior lip 3-lobed; lobes spreading, oblong-elliptic, entire. **Stamens** either 4 and didynamous, or 2 or 3 by reduction of anterior pair, arising near top of corolla tube, exserted; posterior filaments decurrent to base of tube; anthers synthecate, dorsifixed; staminodes 0. **Nectary** at base of ovary on posterior side. **Ovary** bilocular, ± oblong-elliptic; ovules up to 6 per locule on upper part of placenta, few developing; style minutely glandular-puberulous; stigma lingulate, flattened, with 2 marginal bands of stigmatic papillae, nearly as long as style, exserted. **Fruit** a septicidal capsule with a short loculicidal split at tip of each valve, minutely glandular on sutures. **Seeds** 1–4 per locule, each seated on a massive, pulvinate funicle, elliptical, convex on outer face, flat on inner, sinuously wrinkled, pallid, eventually blackish brown.

Monotypic: *Strobilopsis wrightii* Hilliard & B.L.Burtt; sthn Afr., Drakensberg (KwaZulu-Natal) and Sehlabathebe (Lesotho); mainly from Cave Sandstone outcrops, altitude above ± 2 000 m. Close to *Glumicalyx* Hiern.

Sutera Roth 7519000

Roth: 172 (1807; not of 1821); Hiern: 243 (1904) in part; Hilliard: 220 (1994).

Chaenostoma Benth.: 374 (1836a) name conserved; Greuter *et al.*: 298 (1994). *Sphenandra* Benth.: 373 (1836a). *Palmstruckia* Retz.: 15 (1810) name rejected.

Shrublets, suffrutices or perennial herbs, rarely annual, mostly glandular, sometimes aromatic or foetid; stems leafy throughout. **Leaves** usually opposite, sometimes alternate upwards, variously shaped, bases either ± connate or decurrent in narrow wings or ridges, entire to toothed, rarely more deeply lobed. **Flowers** mostly solitary in axils of leaves or bracts, in ± racemose inflorescences, sometimes in cymules or cymose racemes, sometimes panicled. **Bracts** at most adnate to extreme base of pedicel. **Calyx** bilabiate, sometimes obscurely so; posterior lip 3-lobed, anterior lip 2-lobed, or rarely regularly divided into 6–9 lobes; lobes ± linear-lanceolate, usually pubescent. **Corolla** tubular, nearly regular, 5-lobed; tube usually funnel-shaped, rarely cylindrical, mouth round; lobes spreading, suborbicular to oblong, entire, usually glandular-pubescent outside, often with glistening glands as well, inside usually with 1–5 longitudinal bands of clavate hairs in throat, or glabrous, rarely with clavate hairs extending from throat out on to lower part of lobes; posterior lobes exterior in bud. **Stamens** 4(5), didynamous; filaments usually arising in upper part of corolla tube, not decurrent, in 2 species arising in lower part of tube and then all included; posterior pair either included or exserted, anterior pair exserted; anthers synthecate, dorsifixed. **Nectary** semi-annular. **Ovary** bilocular, ± elliptical, often with glistening glands at least on sutures, rarely glandular-pubescent as well; ovules many per locule; style filiform; stigma usually lingulate with 2 marginal bands of stigmatic papillae (rarely short and minutely bifid), exserted, in 2 species shortly bifid (not papillose), deeply included. **Fruit** a septicidal capsule with a short loculicidal split at tip of each valve, glabrous or with glistening glands. **Seeds** roughly elliptical, sometimes angled by pressure, amber-coloured, pallid or grey- to violet-blue; testa thin, tightly investing alveolate endosperm, with several longitudinal rows of transversely elongated pits in a chequer-board pattern.

Species 49, Africa south of the Cunene and Zambezi Rivers; 47 in sthn Afr., widespread but especially in Western and Eastern Cape.

Teedia Rudolphi 7494000

Rudolphi: 289 (1799); Hiern: 210 (1904); Dahlgren & Rao: 451 (1971); Philcox: 18 (1990);

Biennial or perennial, low, woody shrubs or coarse herbs; stems ridged because of decurrent leaf bases, glandular-pubescent. **Leaves** opposite, subovate, sessile or narrowed near base but base usually ± widened or even auriculate, denticulate. **Flowers** in axils of upper leaves or bracts, pedicellate, usually bibracteolate and sometimes with lateral flower buds in their axils, in axillary or terminal cymes, sometimes forming a sympodial thyrse. **Calyx** 5-lobed; tube very short; lobes longer, linear-lanceolate, slightly imbricate. **Corolla** tubular, subregular, 5-lobed, deciduous; tube cylindrical, exceeding or sometimes equalling calyx, bearded in upper part; lobes shorter than tube, obovate, posterior lobes exterior in bud. **Stamens** 4(5), didynamous, included; filaments short, arising near base of corolla tube; anthers oblong, bithecate, with thecae parallel; rudimentary or functional fifth stamen sometimes present. **Ovary** bilocular, subglobose; ovules many; style short, fleshy; stigma ovoid, capitate, rugose, cleft at apex. **Fruit** a subglobose berry or sometimes a drupe, indehiscent. **Seeds** many, dull black, ± ovoid, rugose and reticulate. $x = 12, 19$ (1 report each).

Species 2, tropical and sthn Afr.: *Teedia lucida* (Sol.) Rudolphi, widespread in sthn Afr., in all parts except North-West and Gauteng and extending to Chimanimani Mountains in Zimbabwe; *T. pubescens* Burch. confined to Western Cape.

Tetraselago Junell 7568040

Junell: 190 (1961); Hilliard & Burtt:175 (1977); Hilliard: 534 (1994).

Selago L. in part; Rolfe: 151 (1901).

Tufted, woody, perennial herbs; stems erect or decumbent, simple to much branched, glandular-puberulous and with coarse hairs, leafy. **Leaves** alternate, fascicled, linear-lanceolate to suborbicular, sometimes narrowly oblanceolate or obovate, entire or denticulate, rarely serrate, glandular-punctate. **Flowers** axillary, bracteate, in corymbose inflorescences, terminal or sometimes lateral, in 1 species very congested. **Bracts** adnate to pedicel and at least half of calyx tube, rarely less. **Calyx** slightly bilabiate, 5-dentate. **Corolla** tubular, slightly bilabiate, 5-lobed, tube funnel-shaped; posterior lip exterior in bud; lobes spreading, glabrous outside, often with clavate hairs around mouth. **Stamens** 4, didynamous, exserted; anterior pair arising in throat, exceeding posterior pair which arises a little lower down, filaments of latter pair decurrent to base of tube; anthers synthecate, dorsifixed; staminodes 0. **Nectary** small, adnate to one side of ovary base. **Ovary** bilocular, oblong; ovules 2 per locule from centre of axis, funicles pulvinate, hollowed, 1 turned up, 1 down; stigma lingulate, flattened, exserted, with 2 marginal bands of stigmatic papillae.

Fruit a septicidal capsule with a short loculicidal split at tip of each valve. **Seeds** amber-coloured, turning dull black, ornamented with ± 8 irregularly sinuous longitudinal bands.

Species 4, sthn Afr., highlands of Northern Province and Mpumalanga, W Swaziland and midlands of KwaZulu-Natal.

Torenia L. 7561000

Linnaeus: 619 (1753); Linnaeus: 270 (1754); Philcox: 56 (1990) in part; Fischer: 332 (1992).

Annual herbs, sometimes aquatic; stems slender, procumbent, weakly ascending, or erect, simple or branched, quadrangular, usually glabrous, sometimes rooting at nodes. **Leaves** opposite, decussate, petiolate, ovate to lanceolate, ± serrate, pinnately veined. **Flowers** axillary, pedicellate, usually 2–6 together, fascicled or on minute leafless branches, or sometimes solitary; pedicels ebracteolate, somewhat reflexed in fruit. **Bracts** narrowly linear. **Calyx** tubular, bilabiate, 5-lobed, narrowly winged along veins, markedly so at fruiting, accrescent; lobes shorter than tube. **Corolla** tubular, bilabiate, 4-lobed; tube cylindrical below, widening slightly above; upper lip entire, exterior in bud; lower lip larger, with 3 subequal lobes. **Stamens** 4, didynamous; filaments arising in corolla throat; posterior pair included, with filaments short; anterior pair with filaments longer, arched and connivent under upper corolla lip, each with small boss-like appendage at base; anthers bithecate, usually cohering in pairs; thecae usually confluent at apex. **Nectary** prominent, saucer-shaped. **Ovary** bilocular, oblong, dorsiventral, hairy at apex; locules with unicellular hairs within; ovules many; style semiterete, exserted, persistent; stigma of two membranous lobes. **Fruit** a narrowly oblong-ellipsoid capsule, septicidal or poricidal. **Seeds** small, many, pale yellow; testa with anchor-like thickening on some epidermal cell walls; endosperm alveolate (bothrospermous). $x = 8$ (9, 17—1 report each) (polyploidy).

Species ± 40, tropical; mainly SE Asia, Indian Ocean islands, and Africa; 1 in sthn Afr.: *Torenia thouarsii* (Cham. & Schltdl.) Kuntze, N Botswana, Gauteng, Mpumalanga and KwaZulu-Natal (Tongaland); this species also in South America.

Trieenea Hilliard 7522020

Hilliard: 489 (1989); Hilliard: 418 (1994).

Phyllopodium Benth. in part; Hiern: 319 (1904).

Perennial herbs or shrublets, or sometimes annual, base sometimes woody, usually eventually bushy though often flowering as seedlings; stems erect or decumbent, sometimes sprawling or diffuse, usually branched from base, rarely simple, leafy; pubescence always patent, hairs gland-tipped or not. **Leaves** opposite or sometimes alternate above, usually elliptical to ovate, sometimes broadly ovate or rhomboid, margins deeply and coarsely toothed. **Flowers** in racemes, capitate or elongate, often panicled, always erect. **Bracts** longer than broad, often leaf-like, usually adnate to pedicel only, or sometimes to extreme base of calyx in uppermost flowers. **Calyx** obscurely bilabiate, lobed almost or quite to base, membranous. **Corolla** tubular, bilabiate, 5-lobed, membranous; tube cylindrical and widening rapidly, rarely slightly above, sometimes funnel-shaped, often glandular-pubescent outside; posterior lip 2-lobed, exterior in bud; anterior lip 3-lobed; lobes entire; orange/yellow patch at base of posterior lip extending down back of tube almost to base and there either glabrous or bearded with unicellular clavate hairs. **Stamens** 4, either all exserted or the posterior pair included or appearing in mouth of tube; posterior filaments very briefly to strongly decurrent down corolla tube; anthers synthecate, dorsifixed; staminodes 0. **Nectary** small, on shorter side of ovary base. **Ovary** bilocular, elliptical, base slightly oblique, either glandular-puberulous or glabrous on upper part; ovules up to 14 per locule; style filiform, passing gradually into flattened, lingulate stigma with 2 marginal bands of stigmatic papillae, well exserted. **Fruit** a septicidal capsule with a short, loculicidal split at top of each valve. **Seeds** elliptical or slightly angled, mostly pallid amber or cream, rarely greenish or bluish grey, sinuously wrinkled in longitudinal bands; testa tightly investing endosperm. $x = 6, 7$ (1 report each).

Species 9, South Africa, Western and Eastern Cape mountains from Cederberg, with 7 species, southwards, then eastwards, 1 species extending to Great Winterhoek Mountains, northwest of Uitenhage.

*__Verbascum__ L. 7460000

Linnaeus: 177 (1753); Hiern: 137 (1904); Ferguson: 205 (1972); Wells *et al.*: 658 (1986).

Robust, erect, usually biennial herbs, mainly unbranched, pubescent. **Leaves** entire, variously shaped, toothed or lobed, basal ones forming a rosette, others alternate, very rarely opposite, decurrent. **Flowers** solitary or in groups of 2–5, axillary, bracteate, in lax to dense terminal raceme, shortly pedicellate, sometimes bibracteolate at base. **Calyx** equally 5-lobed, lobes imbricate in bud, glandular hairy. **Corolla** barely tubular, subregular, 5-lobed, usually yellow; tube very short, narrow or sometimes somewhat campanulate; lobes rotate, broad and ± equal, upper lobes exterior in bud. **Stamens** 4 or 5, sometimes 4 fertile and 1 staminode; filaments usually villous; anthers of 2 kinds: posterior ones always reniform and transversely medifixed, anterior ones similar or not (in **V. virgatum* anthers oblong, decurrent or at least obliquely inserted on filament); anthers unithecate by confluence. **Ovary** bilocular; ovules many; style elongated, entire, thickened towards stigmatose apex. **Fruit** a globular, septicidally bivalved capsule; valves usually bifid, exposing central placentiferous column. **Seeds** ovoid or oblong, alveolate with hollows in 6–9 longitudinal rows, not winged. $x = 8, 9, 15$ (7, 11, 12, 13, 17) (B-chromosomes—1 report, aneuploids, high polyploidy).

Species ± 360; mainly Old World, northern temperate regions; 1 in sthn Afr.: **Verbascum virgatum* Stokes, possibly naturalised in Lesotho, Western and Eastern Cape, and perhaps others, sporadic garden escapes.

Veronica L. 7579000

Linnaeus: 9 (1753); Hiern: 367 (1904); Henderson & Anderson: 292 (1966); Merxmüller & Roessler: 56 (1967a); Walters & Webb: 242 (1972); Wells *et al.*: 536 (1986); Philcox: 80 (1990).

Annual or perennial herbs; stems erect, ascending, prostrate or decumbent, often rooting at nodes and much branched, sometimes fleshy and/or hollow, glabrous or pubescent. **Leaves** usually opposite, especially near base, cauline ones sometimes alternate, verticillate or scattered, sessile or petiolate, ovate to lanceolate-oblong, entire or variously dentate or crenate. **Flowers** in terminal or axillary racemes, rarely axillary and solitary, bracteate, pedicellate; bracts 0. **Calyx** with very short tube, 4(5)-partite, where present, fifth posterior lobe smaller, accrescent. **Corolla** barely tubular, usually subrotate, 4(5)-lobed; tube very short, rarely exceeding calyx; limb spreading, lateral lobes exterior in bud. **Stamens** 2, fertile, arising in corolla tube at sides of upper lobe, exserted; anthers bithecate; thecae divergent or parallel, confluent at apex. **Ovary** bilocular; ovules few to many; style with subcapitate stigma. **Fruit** a laterally compressed or turgid, bivalved, loculicidal

(sometimes septicidal) capsule, ovoid to reniform or obcordate. **Seeds** ovoid or orbicular. $x = 7, 8, 9, 17$ (6, 10, 12, 15) (B-chromosomes, aneuploids, high polyploidy).

Species ± 180, mostly temperate, mainly north, few on tropical mountains in Africa, some subcosmopolitan weeds; 1 in sthn Afr.: *Veronica anagallis-aquatica* L., indigenous or introduced from Europe, widespread in wet areas but not Botswana; several others as sporadic escapes or weeds, especially **V. persica* Desf.

Zaluzianskya F.W.Schmidt 7523000

Schmidt: 11 (1793) name conserved; Walpers: 306 (1844); Hiern: 333 (1904); Greuter *et al.*: 298 (1994), not of Necker; Hilliard & Burtt: 1 (1983); Hilliard: 460 (1994).

Nycterinia D.Don: t. 239 (1834); Bentham: 369 (1836a); Bentham: 348 (1846).

Annual or perennial herbs; stems often erect or ascending, sometimes decumbent to prostrate, simple or sparingly branched, leafy throughout or mainly at base, pubescent, hairs often acute, sometimes glandular. **Leaves** opposite, often subopposite or alternate upwards, all radical or radical and cauline, mostly variously elliptical to ovate, sometimes lanceolate, oblanceolate or spathulate, rarely subrotund or rhomboid-ovate, entire to variously toothed, usually somewhat pubescent, sometimes glabrous, rarely villous. **Flowers** ± sessile, in terminal spikes, often capitate or at least dense, sometimes lax, or becoming lax in fruit, erect. **Bracts** adnate to calyx to varying degrees. **Calyx** distinctly bilabiate, strongly 5-ribbed and plicate in flower, expanded in fruit; posterior lip 3-toothed; anterior lip usually 2-toothed, occasionally ± entire; lobes ± deltoid, pubescent at least on margins. **Corolla** ± regular to sometimes bilabiate; tube long, narrow, cylindrical, only slightly expanded in throat, usually pubescent outside, glabrous inside but mouth often bearded with long, acute or clavate hairs; posterior lip exterior in bud; lobes rotate or reflexed (but cleistogamy not uncommon), either entire and variously shaped, or retuse, or Y-shaped and then once or twice bifid, usually glandular outside, glabrous inside or glandular, particularly near mouth. **Stamens** 4 or 2 (anterior or posterior), didynamous, arising near apex of corolla tube; posterior pair with filaments decurrent to base of tube, forming a channel for style, included; anterior anthers usually smaller, often exserted or tips appearing in mouth; all anthers synthecate, dorsifixed; staminodes rarely present and never consistently so. **Nectary** on shorter, posterior side of ovary base, either small, rounded, adnate to ovary, or peg-like and free. **Ovary** bilocular, ± elliptical, tapering upwards into filiform style; ovules many per locule; stigma flattened, lingulate with 2 marginal bands of stigmatic papillae, often exserted. **Fruit** a ± distinctly beaked septicidal capsule with a short loculicidal split at tip of each valve, usually glabrous, rarely a few minute glands at apex. **Seeds** obscurely angled or distinctly, narrowly winged, pallid or mauve-grey, colliculate; testa thin, tightly investing endosperm. $x = 6$.

Species 55, tropical and sthn Afr.; 53 in sthn Afr., in all areas except Botswana, annual species concentrated in Western Cape, thinning out north- and eastwards, with 1 isolated on high mountains of East Africa; perennial species mainly in eastern sthn Afr., decreasing northwards but reaching Zimbabwe and Mozambique.

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Solanaceae

(Asteridae—Solanales)

Compiled by W.G. Welman

Herbs, shrubs, erect or climbing, rarely trees, often with branched hairs, occasionally spiny. **Leaves** alternate, occasionally paired or fascicled, rarely verticillate, simple to lobed or pinnate; stipules 0. **Flowers** bisexual, regular or slightly irregular, rarely solitary, usually in terminal, leaf-opposed or extra-axillary cymes, sometimes appearing umbellate or fasciculate. **Calyx** 4- or 5(6 or 7)-toothed or -lobed, usually persistent, sometimes accrescent, sometimes inflated in fruit. **Corolla** 4- or 5(6 or 7)-lobed; tube cylindric, funnel-shaped, or campanulate or rotate; lobes induplicate, valvate, equal or subequal. **Stamens** as many as corolla lobes and alternating with them, rarely fewer, arising from corolla tube; filaments short or long; anthers 2-thecous, separated or conniving into a cone, with thecae parallel or diverging, dehiscing by terminal pores or longitudinal slits. **Disc** annular, cup-shaped, entire, or lobed, rarely absent. **Ovary** superior, mostly 2-locular and orientated diagonally in flower, sometimes 3–5-locular, sessile or shortly stipitate, with many anatropous or amphitropous ovules in each locule; style terminal, filiform or stout; stigma capitate, cyathiform, globose, often bifid. **Fruit** a berry or capsule dehiscing by valves or circumscissile. **Seeds** usually many.

Genera 90, species ± 2600, cosmopolitan, concentrated in tropical and subtropical America; sthn Afr.: 4 genera indigenous, 5 others represented by introductions, some of which have become widely naturalised. Occasional garden escapes (not included here) are **Lycopersicon pimpinellifolium* (L.) Mill., **Petunia hybrida* Vilm. and **Cyphomandra betacea* (Cav.) Sendtn.

Wright: 87 (1904); Wright: 207 (1906); Podlech & Roessler: 1 (1969); D'Arcy: 75 (1991).

Key to genera

1a Calyx becoming enlarged, bladdery and enclosing fruit:
  2a Calyx lobes with wings down the back ..... ***Nicandra**
  2b Calyx lobes not winged:
    3a Flowers fascicled ..... **Withania**
    3b Flowers solitary ..... ***Physalis**
1b Calyx not inflated :
  4a Fruit a berry:
    5a Stamens arising near base of corolla tube; anthers dehiscing by slits:
      6a Herbaceous annuals or perennials; corolla subrotate, lobes valvate ..... ***Capsicum**
      6b Shrublets, shrubs or trees; corolla not as above:
        7a Shrubs or shrublets usually with thorn-like branchlets; ovary not on stout foot within disc ..... **Lycium**
        7b Shrubs unarmed; ovary on short, stout foot within disc ..... ***Cestrum**
    5b Stamens arising in corolla mouth or throat; anthers dehiscing by pores or slits ..... **Solanum**
  4b Fruit a capsule:
    8a Capsule armed with spines ..... ***Datura**
    8b Capsule unarmed ..... **Nicotiana**

*Capsicum L. 7404000

Linnaeus: 188 (1753); Wright: 250 (1906).

Annual or perennial, much-branched herbs, rarely shrubby at base. **Leaves** entire or repand. **Flowers** solitary or pedicels 2- or 3-nate. **Calyx** shortly campanulate, truncate or with 5 teeth or setae, accrescent. **Corolla** subrotate, 5-partite; lobes valvate. **Stamens** 5, inserted near corolla base; filaments filiform; anthers shorter than or ± as long as filaments, dehiscing longitudinally. **Disc** small. **Ovary** 2(3)-locular; style filiform; stigma ± clavate. **Fruit** a berry, small and globose to large and conical or almost linear, erect or nodding. **Seeds** compressed, rugose or nearly smooth; embryo much curved, cotyledons semiterete. $x = 6$ (9) (aneuploids, high polyploidy).

Species 10, tropical America; sthn Afr.: **Capsicum frutescens* L. naturalised in Swaziland and N KwaZulu-Natal.

*Cestrum L. 7420000

Linnaeus: 191 (1753); Wright: 255 (1906); Bailey & Bailey: 253 (1977).

Shrubs or trees, glabrous to stellately tomentose. **Leaves** alternate, quite entire. **Flowers** axillary, in cymose or fascicled inflorescences; upper cymes usually corymbose or panicled at apices of branches, or nearly all lateral at leafless nodes. **Calyx** campanulate, 5-lobed, valvate. **Corolla** salver-shaped; lobes 5, induplicate-valvate; tube elongate, cylindric or slightly dilated above, contracted at base around ovary. **Stamens** included, arising near middle of corolla tube; filaments filiform, pilose, incrassate or with a small tooth near base; anthers short, cells parallel. **Disc** inconspicuous or rather thick. **Ovary** usually slightly stalked, 2-locular; style filiform; stigma dilated; ovules 3–6 in each locule, micropyle inferior. **Fruit** a slightly fleshy berry, indehis-

cent, globose, ovoid or oblong. **Seeds** few or by abortion solitary, oblong, nearly smooth; embryo straight or slightly curved; cotyledons either ovate or oblong and much broader than radicle, or semiterete and scarcely wider than it. x = 8 (6) (aneuploids, B-chromosomes, polyploidy).

Species 175, tropical America; some cultivated and 2 or 3 naturalised in sthn Afr.; toxic to stock.

*Datura L. 7415000

Linnaeus: 179 (1753); Henderson & Anderson: 264 (1966).

Annual herbs with regular candelabriform branching, glabrous or sparingly hairy. **Leaves** alternate, simple, dentate. **Flowers** solitary, large, white, pinkish or yellow, erect or cernuous. **Calyx** long, tubular, 5-fid or spathaceous, base often persistent. **Corolla** funnel-shaped; lobes 5–10, short, broad, often acuminate; limb plicate. **Stamens** 5, arising near base of corolla tube, included; anthers linear, dehiscing longitudinally, sometimes cohering into a tube. **Ovary** 2-locular or ± spuriously 4-celled; style filiform, dilated and 2-lamellate at apex. **Fruit** a spiny capsule, dehiscing by 4 valves or irregularly, subtended by reflexed enlarged base of calyx. x = 6 (aneuploids, high polyploidy, B-chromosomes—1 report).

Species ± 8, New World; some cultivated; 3 in sthn Afr., naturalised and widespread.

Lycium L. 7379000

Linnaeus: 191 (1753); Wright: 109 (1904).

Shrublets, shrubs, or small trees; branchlets often spiny. **Leaves** often in fascicles. **Flowers** solitary. **Calyx** 3–5-lobed; lobes equal or unequal, often ± as long as tube; tube usually somewhat campanulate. **Corolla** 4- or 5-lobed; tube campanulate, funnel-shaped, urceolate or cylindric; lobes much shorter than, to nearly as long as, the tube. **Stamens** 4 or 5, alternating with corolla lobes, arising in corolla tube, included or exserted; filaments linear, often dilated and hairy at base; anthers 2-thecous. **Disc** annular or cupular. **Ovary** 2-locular, with few to many ovules; style simple, terete, included or slightly exserted; stigma capitate, cyathiform or shortly 2-lobed. **Fruit** a globose, ovoid, or conical berry. **Seeds** suborbicular, compressed. x = 6 (9, 10, 13) (aneuploids, polyploidy).

Species 100, fairly cosmopolitan in warm and temperate regions, especially the Americas; ± 16 in sthn Afr., widespread in all regions.

*Nicandra Adans. 7377000

Adanson: 219 (1763); Wright: 108 (1904); Henderson & Anderson: 268 (1966).

Robust annual, erect, much-branched, ± glabrous herb. **Leaves** membranous, coarsely sinuate-dentate or almost lobed. **Flowers** solitary, on slender pedicels. **Calyx** 5-partite, much enlarged and inflated in fruit, prominently 5-winged, scarious-membranous; lobes cordate, subsagittate, wide, conniving, reticulate. **Corolla** widely campanulate; limb very shortly or obscurely 5-lobed; lobes or folds very narrowly imbricate. **Stamens** 5, arising near corolla base; filaments filiform, dilated at base into a pilose scale; anthers ovate-oblong; thecae parallel, dehiscing longitudinally. **Ovary** 3–5-locular; style columnar; stigma oblong or subglobose, 3–5-partite, lobes conniving; ovules many. **Fruit** a globose berry, much shorter than the enlarged calyx. **Seeds** suborbicular, compressed, minutely scrobiculate; embryo near margin, much curved; cotyledons semiterete. x = 10.

Species 1: **Nicandra physalodes* (L.) Scop., Peru, now naturalised in most warm countries; mainly eastern parts of sthn Afr.

Nicotiana L. 7434000

Linnaeus: 180 (1753); Wright: 119 (1904); Henderson & Anderson: 270 (1966).

Herbs or undershrubs, rarely evergreen shrubs or small trees, usually with glutinous hairs. **Leaves** simple, entire or sinuate. **Flowers** in terminal panicles or long, unilateral, bracteate or ebracteate racemes, rarely solitary and axillary; white, yellow, greenish or pink. **Calyx** 5-fid, ovoid or tubular-campanulate. **Corolla** funnel- or salver-shaped; tube long, cylindrical or slightly ventricose; limb equal or oblique; lobes 5, induplicate, patent. **Stamens** 5, arising below middle of corolla tube, included or exserted, more or less unequal; filaments filiform; anthers ovoid or oblong, deeply 2-lobed; thecae parallel, dehiscing longitudinally. **Ovary** 2- or rarely 4-locular; style filiform; stigma dilated, shortly and widely 2-lobed; ovules many. **Fruit** a 2- or rarely 4-locular capsule, dehiscing to the middle or lower by 2-fid valves. **Seeds** many, small, scarcely compressed, granular; embryo straight or more or less curved, cotyledons semiterete. x = 6, 8, 9, 10 (5, 7, 11, 19, 23) (aneuploids, high polyploidy, B-chromosomes).

Species ± 67, mainly America; 3 naturalised in sthn Afr. and 1 endemic to Namibia: *Nicotiana africana* Merxm.

*Physalis L. 7401000

Linnaeus: 182 (1753); Wright: 105 (1904); Henderson & Anderson: 272 (1966).

Annual or perennial herbs, glabrous or more often clothed with simple or stellate hairs. **Leaves** entire, toothed, sinuate or more rarely pinnatifid. **Flowers** small, solitary, axillary, violet, yellow or white, often purple at base. **Calyx** campanulate or pyramidal, 5-lobed shortly or to the middle, enlarged in fruit, inflated, membranous, 5-angled or prominently 10-ribbed, often 5-auricled at base; teeth conniving. **Corolla** subrotate or very widely campanulate, 5-angled or shortly and widely 5-lobed. **Stamens** 5, arising near corolla base; filaments filiform; anthers erect, usually shorter than filaments; thecae parallel, dehiscing longitudinally. **Ovary** 2-locular; style filiform; stigma shortly 2-lobed; ovules many. **Fruit** a globose berry, enclosed in and much smaller than inflated calyx. **Seeds** few or many, smooth or slenderly tuberculate-rugose, compressed; embryo near margin, curved; cotyledons semiterete. x = 12 (aneuploids, polyploidy)

Species ± 80, mostly New World; ± 7 species naturalised in sthn Afr.

Solanum L. 7407000

Linnaeus: 184 (1753); Wright: 88 (1904); Henderson & Anderson: 276 (1966); Jaeger: 1 (1985).

Herbs, undershrubs, shrubs, or small trees, sometimes climbing, unarmed or spiny. **Leaves** alternate or paired, entire, lobed or pinnatisect. **Flowers** in extra-axillary, dichotomous, racemose or umbellate cymes or in terminal panicles. **Calyx** (4)5–10-toothed or -lobed. **Corolla** often rotate, (4)5(6)-lobed, sometimes with campanulate tube. **Stamens** 5(6) arising at varying heights of corolla tube; filaments linear or oblong, shorter than anthers, rarely rudimentary; anthers large, oblong or lanceolate, dehiscing by pores or longitudinal slits. **Disc** inconspicuous. **Ovary** 2(3 or 4)-locular with many ovules in each locule; style terete, with capitate or bifid stigma. **Fruit** a globose berry. **Seeds** biconvex. x = 12 (23, 41) (aneuploids, high polyploidy, B-chromosomes).

Species ± 1400, cosmopolitan, mainly in tropics; sthn Afr. ± 25 indigenous, widespread in all regions, ± 15 introduced species have become widespread weeds.

Withania Pauquy 7400000

Pauquy: 14 (1825); Wright: 107 (1904); Henderson & Anderson: 286 (1966); Podlech & Roessler: 17 (1969); Hepper: 211 (1991).

Hoary herbs and subshrubs, sparsely pubescent to glabrescent. **Leaves** entire or slightly sinuate. **Flowers** small, usually fascicled, subsessile or shortly pedicellate. **Calyx** campanulate, 5- or 6-toothed, enlarged and inflated in fruit. **Corolla** narrowly campanulate, 3–6-fid; lobes valvate. **Stamens** arising near corolla base; filaments slightly flattened; anthers erect, thecae parallel, dehiscing longitudinally. **Disc** annular, crenulate or 0. **Ovary** 2-locular; style filiform; stigma shortly and widely 2-lamellate or subglobose; ovules many. **Fruit** a globose berry, shorter than enlarged calyx. **Seeds** compressed; embryo near margin, incurved or spiral, cotyledons semiterete. $x = 12$ (polyploidy).

Species ± 10, Old World; 1, *Withania somnifera* (L.) Dun., widespread in sthn Afr.

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Sphenocleaceae

(Asteridae—Asterales)

Compiled by W.G. Welman

Annuals associated with water, erect, glabrous, somewhat soft and sparsely branched. **Leaves** alternate, simple, entire, shortly petioled or subsessile, lanceolate to oblanceolate; stipules 0. **Flowers** bisexual, regular, in dense, bracteate terminal spikes. **Calyx** as long as corolla, 5-partite, persistent; lobes broadly elliptic, imbricate. **Corolla** 5-lobed; tube short, broader than long; lobes ovate-oblong, about as long as tube, imbricate. **Stamens** 5, arising in middle of corolla tube, alternating with petals, included; filaments much shorter than anthers; anthers 2-thecous, almost quadrate in outline, opening by longitudinal slits. **Ovary** half-inferior, 2-locular, with many ovules in each locule from axile placentas; stigma shortly bifid. **Fruit** a depressed, subglobose capsule, dehiscing transversely, operculum falling with calyx lobes. **Seeds** ellipsoid, sculptured.

Genus 1, fairly cosmopolitan in tropical and subtropical areas; usually placed under Campanulaceae in the past; sthn Afr.: species 1.

Thulin: 114 (1983); Welman: 31 (2000).

Sphenoclea Gaertn. 8680000

Gaertner: 113, t. 24/5 (1788); Thulin: 114 (1983); Welman: 31 (2000).

Description as for family.

Species 2; 1 in sthn Afr.: *Sphenoclea zeylanica* Gaertn., N Namibia, N Botswana, Mpumalanga, Swaziland, KwaZulu-Natal.

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Sterculiaceae

[Malvaceae—Byttnerioideae, Dombeyoideae, Sterculioideae, fide Bayer *et al.* (1999)]

(Dilleniidae—Malvales)

Compiled by C.L. Bredenkamp

Trees, shrubs, undershrubs, or herbs, sometimes monoecious, dioecious or polygamous, usually stellate-pubescent. **Leaves** alternate, simple or digitately compound, penni- or palmately nerved, usually petiolate; stipules usually present. **Flowers** bisexual or unisexual, usually regular, arranged in axillary or terminal racemes, cymes, corymbs or panicles, rarely solitary; sometimes with an epicalyx or floral bracts. **Calyx** persistent, 3–5-lobed, valvate. **Corolla** of 0–5 petals, free or adnate to base of staminal tube, twisted. **Stamens** 5–many, free or united into a tube around ovary; staminodes sometimes present; anthers 2-thecous, with longitudinal slits. **Ovary** usually superior, with 1–5 (or more) free, or ± united carpels, with 1–many, usually axile ovules in each carpel. **Fruit** usually dry, sometimes fleshy, dehiscent or indehiscent. **Seeds** with embryo straight or curved; endosperm usually present.

Genera 72, species 1500, cosmopolitan in tropical and subtropical climates; sthn Afr.: genera 7, species 181.

Harvey: 178 (1860) and l.c.: 179 under Byttneriaceae; Wild: 517 (1961); Friedrich-Holzhammer, Merxmüller & Roessler: 1 (1969).

(See note on family circumscription under Malvaceae.)

Key to genera

1a Petals absent; flowers unisexual or sometimes bisexual; mainly trees (STERCULIOIDEAE):
2a Stamens many, with anthers capitate on apex of staminal column ..... **Sterculia**
2b Stamens 10(12), with anthers in a regular or wavy whorl around apex of staminal column ..... **Cola**
1b Petals present; flowers bisexual; mostly perennial herbs, shrublets, or undershrubs, sometimes shrubs or small trees:
3a Staminodes conspicuous (DOMBEYOIDEAE):
4a Fibrous herbs or undershrubs; petals becoming detached, persisting like a cap on the ovary; 5 fertile stamens ..... **Melhania**
4b Shrubs or small trees; petals becoming papery, persistent; 10–15 fertile stamens ..... **Dombeya**
3b Staminodes 0 or inconspicuous (BYTTNERIOIDEAE):
5a Ovary 5-locular:
6a Locules 2-ovulate; filaments ± connate into a tube; anthers oblong-elliptic, glabrous ..... **Melochia**
6b Locules 3–many-ovulate; filaments free or slightly connate at the base, ± obovate or tuberculate-cruciform; anthers tapering to an acuminate apex, pubescent, pilose or ciliolate ..... **Hermannia**
5b Ovary 1-locular: ..... **Waltheria**

Cola Schott & Endl. 5091000

Schott & Endlicher: 33 (1832); Ross: 246 (1973); Verdoorn: 277 (1981c).

Trees, dioecious or monoecious, or occasionally with bisexual flowers; bark usually flaking. **Leaves** entire or lobed; petioles often with a swollen apical portion (pulvinus). **Flowers** in axillary clusters, cymes, small panicles or solitary, sometimes on old wood; unisexual, occasionally bisexual. **Calyx** 4- or 5(6)-lobed. **Petals** absent. **Male flowers**: stamens usually 10, united into a column, bearing sessile anthers in 1 or 2 rings around apex, vestigial carpels often sunk in top of androphore column. **Female flowers**: carpels (3)4 or 5(–10), cohering at first with a ring of rudimentary stamens at base; ovules several to many per carpel; styles as many as carpels. **Fruit** splitting into 4 or 5 carpels, sometimes 1 or more aborting. **Seeds** exendospermous; cotyledons thick, 2 or more. $x = 7, 10$.

Species over 100, all African; 2 in sthn Afr., KwaZulu-Natal to Eastern Cape.

Dombeya Cav. 5053000

Cavanilles (1786) name conserved; Harvey: 220 (1860); Wild: 518 (1961); Friedrich-Holzhammer, Merxmüller & Roessler: 2 (1969); Verdoorn & Herman: 1 (1986); Seyani: 1 (1991).

Trees or, more often, lax to bushy shrubs, sometimes straggling; bark usually stringy; indumentum mainly of stellate or tufted, uni- or multicellular hairs, often lepidote and with simple, thick-walled or glandular hairs as well. **Leaves** simple, usually palmately nerved; stipules present. **Flowers** in highly variable cymose axillary inflorescences; floral bracts 3, caducous, pubescent on both surfaces, close to calyx or scattered, usually free. **Calyx** 5-lobed, pubescent on outside; tube short, usually with 5 patches of papillae just below base of lobes within; lobes reflexed in mature flowers. **Petals** 5, usually obliquely obovate, cuneate (shaped like a butterfly wing), white or in varying shades of rose, sometimes flecked or veined with purplish red or deep rose at base, persistent, turning cinnamon-rufous with age. **Stamens** 10–40, usually 15, united at base into a short tube; filaments of different lengths in groups of 3–8 (occasionally 2 or 4), alternating with 5 narrowly linear-spathulate staminodes; anthers oblong, thecae parallel. **Ovary** 3–5-locular, sutures often partly bristly pubescent inside; style 3–5-branched; ovules 2–8 in each locule. **Capsule** subglobose, loculicidally dehiscent. **Seeds** globose to obovate-oblong, triquetrous; testa hard, rough with minute ridges, dots or pits. $x = 7, 9, 10$ (aneuploids, polyploidy).

More than 300 described species, 19 in Africa, also present in Arabian Peninsula, Madagascar, Comores and Mascarenes; 8 in sthn Afr., widespread.

Hermannia L. 5056000

Linnaeus: 673 (1753); Harvey: 180 (1860); Wild: 537 (1961); Friedrich-Holzhammer, Merxmüller & Roessler: 3 (1969); De Winter: 263 (1974); Verdoorn: 1 (1980).

Mahernia L.: 227 (1767); Harvey: 207 (1860).

Herbs, shrublets or undershrubs, frequently stellate-pubescent, sometimes glandular. **Leaves** entire, toothed, or pinnatifid; stipules often foliaceous, rarely 0. **Flowers** axillary and solitary or 2-nate or in terminal pseudoracemes or panicles. **Calyx** 5-lobed; tube globose to campanulate. **Petals** 5, obovate or oblong, sessile or clawed, spirally twisted; claw with infolded margin. **Stamens** 5, opposite petals, longer or shorter than ovary; filaments connate at base, sometimes almost free, linear with broad, membranous wings or somewhat cruciform; anthers mostly lanceolate, slightly or distinctly 2-lobed at apex. **Ovary** sessile or shortly stalked, 5-lobed, 5-locular, with few to many ovules in each locule, hairy; styles 5(1), capitate. **Fruit** a 5-locular, loculicidal capsule, sometimes horned. **Seeds** reniform, usually ribbed. $x = 6$ (1 report).

Species ± 180, tropical Africa 11 species, plus ± 30 sthn Afr. species extending into that region, American species 3, and 1 or more in Australia; ± 162 in sthn Afr.: the subgenera *Hermannia* with ± 94 and *Mahernia* with ± 68 species, in all countries and provinces.

Melhania Forssk. 5047000

Forsskål: 64 (1775); Harvey: 221 (1860); Wild: 528 (1961); Friedrich-Holzhammer, Merxmüller & Roessler: 23 (1969); Verdoorn: 263 (1981a).

Shrublets or herbaceous plants, rarely polygamous, with a woody rootstock, new growth usually pubescent; pubescence of stellate or tufted unicellular hairs often matted to form a thin or dense tomentum or, in the case of long, tufted hair, forming a hispid or villose pubescence, sometimes scales and short glandular hairs present as well. **Leaves** simple; stipules subulate. **Flowers** bisexual, rarely unisexual; axillary, or in terminal, racemose or cymose inflorescences, often reduced to a solitary flower; epicalyx bracts 3, persistent, united at base, arising subunilaterally, pubescent on both surfaces. **Calyx** 5-lobed, persistent. **Petals** 5, obovate, somewhat unequal-sided, convolute, hypogynous, yellow, early deciduous from base but faded flowers persisting, like a cap, with convolute apices, on capsule. **Stamens** 5, alternating with 5 ligulate staminodes, connate at base, forming a short annulus or collar. **Ovary** stellate-tomentose, 5-locular, ovules 1–many in each locule; style with 5 stigmatic branches, sometimes abortive in essentially male flowers. **Capsule** loculicidally dehiscent. **Seeds** 3- or more-sided, usually with minute, raised, broken lines or dots on surface. $x = 6$ (1 report, polyploidy).

Species ± 60, Africa to India; 13 in sthn Afr., in Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

Melochia L. 5057000

Linnaeus: 674 (1753); Linnacus: 304 (1754); Wild: 535 (1961).

Herbs or shrubs. **Leaves** simple; stipules ± subulate, ciliolate. **Flowers** bisexual, in terminal or axillary cymose clusters; pedicels bracteate. **Calyx** campanulate or inflated, shortly 5-lobed. **Petals** 5, usually obovate or oblong-spathulate, marcescent. **Stamens** 5, sometimes coherent with petals at base; filaments ± connate. **Ovary** sessile or stipitate, 5-locular; ovules 2 per locule; styles 5, free or connate at base. **Fruit** a loculicidal, 5-valved capsule; locules 1-seeded. **Seeds** ascending; embryo straight, with some endosperm, cotyledons flat. $x = 9$ (7, 23) (polyploidy).

Species 54, widely distributed through the tropical regions of the Old World; 1 in sthn Afr.: *Melochia corchorifolia* L., often a weed of cultivation in Botswana.

Sterculia L. 5083000

Linnaeus: 1007 (1753); Harvey: 178 (1860); Wild: 551 (1961); Friedrich-Holzhammer, Merxmüller & Roessler: 26 (1969).

Trees, deciduous, monoecious or dioecious; bark smooth, often peeling in papery flakes. **Leaves** simple or digitately compound; stipules 0. **Flowers**, at least functionally, unisexual, in axillary or terminal clusters on abbreviated shoots, or in panicles, produced before or with leaves. **Calyx** 5(6)-lobed, petaloid. **Petals** 0. **Stamens**: staminal tube giving rise to many stamens from rim of terminal cupule; filaments short; anthers bilocular, with longitudinal, extrorse dehiscence. **Ovary** of 4 or 5 cohering carpels on a disc surrounded by stamens, rudimentary in male flowers; styles cohering; stigma peltate or 4- or 5-lobed. **Fruit** separating into 1–5 follicles. **Seeds** 4–16 per follicle. $x = 10$ (6, 8) (polyploidy).

Species ± 300, cosmopolitan in tropics; 5 in sthn Afr., in Namibia, Botswana, Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and 1 extending into Eastern Cape near Uitenhage.

Waltheria L. 5059000

Linnaeus: 673 (1753); Harvey: 180 (1860); Wild: 536 (1961); Friedrich-Holzhammer, Merxmüller & Roessler: 27 (1969); Scott: 452 (1978); Verdoorn: 275 (1981b).

Shrublets, subherbaceous at first, pubescent with stellate, tufted and simple hairs. **Leaves** simple, crenate-dentate; stipulate. **Flowers** in axillary and terminal cymes, often congested, or heads of flowers racemosely or paniculately disposed; bracts often present. **Calyx** 5-lobed. **Petals** 5, marcescent. **Stamens** 5; filaments united into a tube; anther cells parallel. **Ovary** 1-locular; ovules 2, anatropous; style somewhat excentric, clavate or fimbriate at apex. **Capsule** usually 1-seeded. **Seed** ascending, endospermous; embryo straight. $x = 10$ (6, 7, 13) (polyploidy).

Species 67, tropics and subtropics of both Old and New World, greatest concentration of species in South and Central America, only 7 occur in the Old World and one of these is common to the Old and New World: *Waltheria indica* L., the only species found in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Northern Cape.

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Stilbaceae

(Asteridae—Lamiales)

Compiled by J.P. Rourke

Single-stemmed reseeders or multistemmed, lignotuberous shrubs or shrublets. **Leaves** in dense whorls or pseudowhorls of 3–7, mostly ericoid, linear, with recurved margins; stipules 0. **Flowers** bisexual, irregular or regular, usually in sessile, terminal, globose to cylindric spikes, or on few-flowered short, axillary branchlets; each flower subtended by 2 opposite leaf-like bracts or prophylls. **Calyx** of 5 sepals, usually fused and tubular basally with 5 free lobes; occasionally completely free. **Corolla** tubular, with 4 or 5 free lobes, regular or strongly irregular and bilabiate; throat frequently with a dense ring of pubescence. **Stamens** usually 4 (posterior stamen 0), or 5, arising between corolla lobes; filaments short, free; anthers 2-thecous, basi- to dorsifixed; thecae usually confluent at apex, parallel or often diverging below, longitudinally dehiscent. **Disc** small to obsolete. **Ovary** superior, usually slightly compressed, with 2 locules; often becoming 1-locular by abortion or loss of septum; ovules usually 1 in each locule, either basal or pendulous, or 2(3) in each locule, ascending and pendulous (*Retzia*). **Style** terminal on ovary, filiform, erect, minutely bilobed. **Fruit** a dehiscent capsule. **Seeds** ovoid, usually reticulate.

Genera 6, species ± 14, endemic to the SW Western Cape.

Pearson: 181 (1901); Cronquist: 867 (1981); Rourke: 9 (2000).

Retzia Thunb. was formerly often placed in the monotypic family Retziaceae (Dyer 1975, Dahlgren 1988, Takhtajan 1997).

Classification of Stilbaceae (Thorne 1992)

Subfamily RETZIOIDEAE (Corolla tube 45–55 mm long, pubescent externally, orange-red with black tips; stamens 5): *Retzia*

Subfamily STILBOIDEAE (Corolla tube shorter than 12 mm, glabrous externally, uniformly mauve, pink or white; stamens 4): *Campylostachys*, *Euthystachys*, *Kogelbergia*, *Stilbe*, *Thesmophora*

Key to genera

1a Corolla tube 45–55 mm long, pubescent externally, orange-red with black tips ..... **Retzia**
1b Corolla tube shorter than 12 mm, glabrous externally, uniformly mauve, pink or white:
2a Corolla 4-lobed:
3a Sepals free; corolla lobes glabrous ..... **Campylostachys**
3b Sepals fused, forming a tube; corolla lobes pubescent ..... **Thesmophora**
2b Corolla 5-lobed:
4a Corolla prominently bilabiate; with 2 larger, erect posterior petals and 3 narrow anterior petals ..... **Stilbe**
4b Corolla regular; lobes equal or almost equal:
5a Corolla lobes pubescent on inner surface ..... **Kogelbergia**
5b Corolla lobes glabrous ..... **Euthystachys**

Campylostachys Kunth 7133000

Kunth: 207 (1832); Pearson: 183 (1901).

Ericoid, lignotuberous, multistemmed shrublets. **Leaves** ericoid, patent, in whorls of 4, linear-acute. **Inflorescence** a terminal subcernuous, globose spike. **Flowers** sessile, subtended by 2 opposite, lanceolate-acute floral bracts. **Calyx** glabrous, sticky; sepals free, imbricate, narrowly lanceolate-cymbiform, apices acute. **Corolla** regular, broadly tubular, of 4 equal, glabrous petals, tube and petals approximately same length; throat fringed with a ring of pubescence. **Stamens** 4. **Ovary** ovoid-cylindric, slightly compressed, 2-locular with a single basal ovule in each locule; style straight, terete, glabrous.

Species 1: *Campylostachys cernua* (L.f.) Kunth, Western Cape.

Euthystachys A.DC. 7135000

Candolle: 606 (1848); Pearson: 186 (1901).

Ericoid shrublets, lignotuberous, multistemmed. **Leaves** ericoid, linear, in whorls of 4, initially pubescent, soon glabrous. **Inflorescence** a sessile ovoid spike. **Flowers** sessile, subtended by 2 opposite, softly pubescent bracts. **Calyx** regular; sepals equal, fused into a tube in their lower third, soft-textured, externally pubescent. **Corolla** regular, lower half tubular-funnelform, upper half with 5 equal, spreading, ovate-acute lobes; glabrous but throat fringed with a ring of pubescence. **Stamens** 4, slightly exserted; posterior stamen 0. **Ovary** laterally compressed, glabrous, obovoid, 2-locular, with a basal ovule in each locule; style straight, filiform, glabrous.

Species 1: *Euthystachys abbreviata* A.DC., central Western Cape mountains.

Kogelbergia Rourke 7134010

Rourke: 12 (2000).

Stilbe P.J.Bergius sect. *Amphistilbe* A.DC.: 606 (1848).

Single-stemmed or multistemmed, lignotuberous shrublets. **Leaves** ericoid, in whorls of 5–7, narrowly lanceolate-linear. **Inflorescence** a sessile, globose or ovoid terminal spike. **Flowers** sessile, subtended by 2 opposite floral bracts. **Calyx** regular; sepals 5, either free or fused and tubular at base. **Corolla** regular, funnelform, 5-lobed, glabrous externally but inner surface of lobes densely pubescent; throat fringed with a dense ring of pubescence. **Stamens** 4, exserted; posterior stamen 0. **Ovary** ovoid, bilaterally flattened, 1-locular with 2 basal, erect ovules; style straight, terete.

Species 2, Western Cape.

Retzia Thunb. 7456000

Thunberg: 55 (1776); Leeuwenberg: 333 (1964); Goldblatt & Keating: 321 (1976); Dahlgren *et al.*: 545 (1979); Cronquist: 867 (1981); Bremer *et al.*: 213 (1994).

Virgate, multistemmed, lignotuberous shrubs. **Leaves** in pseudowhorls of 3–5, very narrowly lanceolate-linear to linear, straight, margins recurved producing 2 prominent grooves on undersurface, softly pubescent, later glabrescent. **Flowers** on short axillary shoots, in groups of up to 3, subtended by 2 opposite foliaceous bracts as long as the calyx. **Calyx** regular, sericeous, lower half tubular; upper half with 5 free, equal, narrowly lanceolate lobes. **Corolla** regular, tubular, very slightly curved at base, red, softly sericeous; lobes broadly lanceolate, black, densely sericeous. **Stamens** 5, equal, inserted between corolla lobes on short filaments. **Ovary** conic-ovoid, glabrous, 2-locular with 2 or 3 ovules in each locule, with 1(or 2) erect, the other(s) pendent; style glabrous, filiform, exserted; stigma bilobed. **Seeds** ovoid, reticulate, yellowish brown.

Species 1: *Retzia capensis* Thunb., Western Cape mountains.

Stilbe P.J.Bergius 7134000

Bergius: 30 (1767); Rourke: 11 (2000).

Stilbe P.J.Bergius sect. *Eustilbe* A.DC.: 606 (1848). *Eurylobium* Hochst.: 228 (1842). *Xeroplana* Briq.: 336 (1896); Rourke: 1 (1977).

Ericoid shrublets, occasionally multistemmed and lignotuberous. **Leaves** ericoid, in whorls of 3–5, linear-subulate to narrowly lanceolate. **Inflorescence** a dense, sessile, terminal spike. **Flowers** sessile, subtended by 2 opposite floral bracts. **Calyx** tubular, usually hard, occasionally slightly abaxially curved, with 5 lobes. **Corolla** tubular, bilabiate with 2 erect, glabrous posterior lobes and 3 narrower, glabrous anterior lobes; interior of throat usually ringed with dense pubescence, rarely glabrous. **Stamens** 4, slightly exserted. **Ovary** oblong, compressed, potentially 2-locular but abaxial locule abortive,

leaving a single locule with a single basally attached ovule; style straight, terete.

Species 7, Western Cape.

Thesmophora Rourke 7133010

Rourke: 89 (1993).

Dwarf, sprawling shrublets inhabiting rock crevices. **Leaves** ericoid, in whorls of 4, very narrowly lanceolate-acute, margins minutely serrate, glabrous. **Inflorescence** a subterminal spike of 20–35 flowers. **Flowers** sessile, subtended by 2 opposite bracts. **Calyx** tubular, regular, glabrous, 5-lobed. **Corolla** tubular, bilabiate, 4-lobed; upper lip rounded, galeate; lower lip of 2 rounded lateral lobes and a minute acute median lobe; lobes densely setose on outer surface. **Stamens** 4, slightly exserted; posterior stamen 0. **Ovary** obconic, with a lobed fleshy disc, minutely stipitate, glabrous, 2-locular with a single pendulous ovule in each locule; style filiform, glabrous.

Species 1: *Thesmophora scopulosa* Rourke, Ceres Mountains (Western Cape).

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Strychnaceae

(Asteridae—Gentianales)

Compiled by J.E. Victor

Trees, shrubs or scramblers, with or without spines; bark sometimes thickly corky. **Leaves** decussate, 3-, 5- or 7-nerved from base, sometimes rudimentary near base of lateral, ultimate branchlets; stipules reduced to an interpetiolar ridge. **Inflorescence** terminal or axillary, cymose; cymes simple or compound. **Flowers** regular, bisexual. **Calyx** 4- or 5-lobed; lobes ± as long as tube or longer, sometimes much longer, then linear to linear-subulate and as long as or longer than corolla; tube glabrous within. **Corolla** 4- or 5-lobed, greenish, cream or whitish; lobes valvate, inner face often bearded, at least at base; tube glabrous or puberulous within, sometimes bearded at throat. **Stamens** 4 or 5, arising on corolla tube, usually near throat; filaments short; anthers basifixed, included to exserted, thecae distinct, with longitudinal slits. **Ovary** superior, 1- or 2-locular, rarely 3-locular at base; style straight; stigma terminal; ovules several to many, axile or basal. **Fruit** a berry, often globose, 10–90 mm in diam., rind leathery or thick and woody. **Seeds** 1–several, embedded in pulp, variously shaped, with hilum in various positions; cotyledons thin, white; endosperm horny; seed coat sometimes becoming cartilaginous. $x = 11$ (12) (polyploidy).

Genera 3, species 220, Africa, Asia, Malesia; sthn Afr.: genus 1, species 9.

Takhtajan: 425 (1996).

The family was formerly included in the Loganiaceae.

Strychnos L. 6460000

Linnaeus: 189 (1753); Verdoorn: 136 (1963); Roessler: 1 (1967); Leeuwenberg: 353 (1983).

Description as for family.

Species ± 400, cosmopolitan under tropical and subtropical conditions; 9 in sthn Afr., widespread, but not in Western Cape.

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Tamaricaceae

(Dilleniidae—Violales)

Compiled by C.L. Bredenkamp

Shrubs or small trees, evergreen, usually halophytic, rarely dioecious. **Leaves** reduced to amplexicaul, vaginate scales, sessile, alternate, punctate with sunken, salt-secreting glands; stipules 0. **Inflorescence** a simple, many-flowered, catkin-like raceme on old and/or on young wood; bracts ± resembling leaves, 1 per flower. **Flowers** bisexual or rarely unisexual, regular, shortly pedicelled, very small and very many. **Sepals** 5, free, spreading. **Petals** 5, free, longer than sepals, white, pink or red. **Disc** saucer- to cup-shaped, often fleshy, dark-coloured with margin variously lobed. **Stamens** 4–10, fused basally with the disc; filaments free, thin; anthers 2-locular, versatile, with longitudinal slits, apiculate or obtuse; in female flowers changed to staminodes. **Ovary** superior, 1-locular, flask-shaped, with 3(4 or 5) basal-parietal placentas bearing several to many erect, anatropous ovules; styles 3, short, incurved. **Fruit** a usually 3-valved capsule. **Seeds** several to many, narrowly ovoid with an apical tuft of hairs and a plumose awn; endosperm 0. $x = 12$ (aneuploids, polyploidy).

Genera 4, species ± 75, Old World, mostly in the northern hemisphere; sthn Afr.: genus 1, species 1 indigenous, 1 or 2 naturalised.

Harvey: 119 (1860) as Tamaricineae; Hunt: 1 (1966); Podlech: 1 (1968); Obermeyer: 36 (1976); Baum: 14 (1978); Van Wyk & Van Wyk: 68 (1997).

Tamarix L. 5239000

Linnaeus: 270 (1753); Harvey: 119 (1860); Podlech: 1 (1968); Obermeyer: 36 (1976); Baum: 19 (1978).

Description as for family.

Species ± 50, mainly around the Mediterranean basin, westwards to England and the Canary Isles, eastwards as far as China; with 1 isolated species (*Tamarix usneoides* E.Mey. ex Bunge) in southwestern and sthn Afr. Two species commonly cultivated in sthn Afr.: **T. gallica* L., the French Tamarisk, and **T. ramosissima* Ledeb.

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Thymelaeaceae

(Dilleniidae—Euphorbiales)

Compiled by C.L. Bredenkamp and J.B.P. Beyers

Shrubs, shrublets or small trees, often ericoid, rarely perennial herbs, very rarely annuals; often containing toxic substances (Peterson 1978); stems and branches with tough, cortical, often shining, fibres. **Leaves** alternate or opposite, sessile or shortly petiolate, simple, entire, small, needle-like, 1-nerved, to flat, pinnately nerved, herbaceous or coriaceous, sometimes glandular-punctate; stipules 0. **Inflorescences** terminal or axillary, sessile or pedunculate, racemose (spikes, fascicles, umbels or heads), flowers rarely solitary, often with deciduous or persistent bracts. **Flowers** bisexual, regular or rarely slightly irregular, often sweetly scented at night, entomophilous except *Passerina* which is anemophilous. **Calyx** (hypanthium, perianth tube or receptacle) tubular or funnel-shaped, sometimes articulated above ovary, usually coloured, often petal-like; lobes (3)4 or 5(6), usually imbricate, equal or often with 2 interior ones slightly smaller. **Petals** (petaloid appendages or scales) generally arising in throat of calyx tube, as many or twice as many as calyx lobes, well developed, entire or divided, often reduced to small fleshy glands or 0. **Stamens** as many or twice as many as calyx lobes (rarely reduced to 2 or 1), in 1 or 2 whorls, upper whorl antisepalous; anthers with short filaments or sessile, 2-thecous, usually introrse, rarely extrorse or horseshoe-like, opening lengthwise by slits; pollen globose, usually polyforate and pollen wall with 'croton-pattern'. **Ovary** superior, 1- or 2-locular, sessile or shortly stipitate; ovule 1 in each locule, usually pendulous, anatropous; style filiform, sometimes very short, terminal or lateral; stigma usually capitate, sometimes papillate. **Disc** hypogynous, membranous or fleshy, annular, cupular or scale-like, sometimes minute or 0. **Fruit** an achene, nut, drupe or loculicidal capsule, sometimes fleshy, usually enclosed in base of persistent calyx tube. **Seed** usually with a caruncle-like appendage, outer coat thin or crustaceous, usually black, with or without endosperm; embryo straight; cotyledons flat or thickened, narrow or broad.

Genera ± 50, species ± 600, cosmopolitan, especially Africa and Australia; sthn Afr.: genera 8, species 192.

Wright: 1 (1915); Domke: 1 (1934); Peterson: 623 (1958); Peterson: 207 (1959a); Peterson: 465 (1959b); Friedrich-Holzhammer: 1 (1968); Peterson: 1 (1978); Bond & Goldblatt: 429 (1984); Hilliard & Burtt: 182 (1987).

Key to genera

1a Ovary 2-locular; glabrous shrub with pedicelled flowers in small, terminal umbels ..... **Peddiea**

1b Ovary 1-locular; flowers sessile or subsessile:

2a Petals present in the form of fleshy or membranous outgrowths from mouth of calyx tube:

3a Petals free, 4, 5, 8 or 12; mainly shrublets, often ericoid:

4a Stamens 8 or 10; flowers mainly in heads ..... **Gnidia**
4b Stamens 4; flowers mainly in axils of upper leaves; stiff hairs surround base of petals ..... **Struthiola**
3b Petals usually ± united at base or in pairs; erect or scandent shrubs, with expanded, sometimes membranous leaves:
5a Flowers 4-merous, in ebracteate, terminal heads or spikes ..... **Englerodaphne**
5b Flowers 5-merous, axillary, solitary or fascicled ..... **Synaptolepis**
2b Petals absent:
6a Calyx tube with scales below stamen attachment ..... **Lachnaea**
6b Calyx tube without scales below stamen attachment:
7a Flowers 4(5)-merous; disc absent; mostly shrublets, often ericoid:
8a Stamens included; leaves not involute, glabrous or hairy ..... **Gnidia**
8b Stamens exserted; leaves involute and woolly-lined ..... **Passerina**
7b Flowers 5-merous, in pedunculate, bracteate heads; shrubs or small trees, with expanded, glossy leaves ..... **Dais**

Dais L. 5465000

Linnaeus: 556 (1762); Wright: 2 (1915); Verdoorn: t. 869 (1942); Domke: 108, 133 (1934); Peterson: 631 (1958); Petcrsen: 16 (1978).

Shrubs or small trees. **Leaves** opposite or irregularly spaced, expanded. **Flowers** pink, in dense, pedunculate heads, subtended by an involucre of 2–6 broad bracts. **Calyx** hairy, 5-lobed; tube cylindric, often slightly curved; lobes lanceolate, much shorter than tube. **Petals** 0. **Stamens** 10, inserted in calyx tube, of different lengths; anthers bright yellow, oblong, shorter than filaments. **Disc** fleshy, cupular, unequal-sided. **Ovary** sessile, 1-locular, with solitary ovule, with long hairs on upper part; style somewhat exserted; stigma green, globose, with glandular hairs. **Fruit** dry, enclosed in base of calyx tube. **Seeds** black, ovoid, with crustaceous, pustulate testa. $x = 9$ (1 report).

Species 2, one each in Africa and Madagascar; 1 in sthn Afr.: *Dais cotinifolia* L., Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Lesotho and Eastern Cape.

Englerodaphne Gilg 5438000

Gilg: 274 (1894); Pearson: 237 (1910); Wright: 78 (1915); Domke: 134 (1934); Phillips: 65 (1944); Peterson: 18 (1978).

Large shrubs or small trees. **Leaves** opposite, expanded, membranous. **Flowers** in heads or spikes; bracts 0. **Calyx** 4-lobed; tube cylindric; lobes ovate or lanceolate. **Petals** 4, bipartite, appearing as 8 linear or oblong lobes, almost as long as calyx lobes, membranous. **Stamens** 8, in two series; upper series in throat, the other slightly below; filaments very short; anthers linear. **Ovary** 1-locular, with a single ovule and with long, somewhat stiff hairs on upper part; style lateral, included; stigma simple or subglobose. **Fruit** dry, enclosed in persistent base of calyx tube. **Seeds** small.

Species 2 or 3, Africa; endemic in sthn Afr., Swaziland, KwaZulu-Natal, Western and Eastern Cape especially near East London.

Gnidia L. 5435000

Linnaeus: 358 (1753); Wright: 42 (1915); Domke: 134 (1934); Phillips: 61 (1944); Peterson: 466 (1959a); Bond & Goldblatt: 429 (1984); Hilliard & Burtt: 182 (1987).

Lasiosiphon Fresen.: 602 (1838); Pearson: 227 (1910); Wright: 69 (1915); Domke: 133 (1934); Phillips: 61 (1944). *Arthrosolen* C.A.Mey.: 359 (1843); Pearson: 234 (1910); Wright: 63 (1915); Phillips: 61 (1944). *Pseudognidia* E.Phillips: 63 (1944). *Basutica* E.Phillips: 64 (1944). *Struthiolopsis* E.Phillips: 64 (1944).

Shrublets, undershrubs, or shrubs, often ericoid. **Leaves** opposite or alternate. **Flowers** usually in terminal heads or clusters, sometimes solitary or in short spikes; bracts present or 0. **Calyx** 4- or 5-lobed; tube cylindric to narrowly campanulate, usually hairy and articulated near base; lobes much shorter than tube, mainly oblong or obovate. **Petals** 0, same number, twice, or sometimes three times as many as calyx lobes, membranous or fleshy, flat or terete, sometimes hairy or surrounded by hairs, smaller than calyx lobes. **Stamens** usually twice as many as calyx lobes, in 2 series; upper row in mouth of calyx tube, or rarely 0 or aborted; other row in throat or lower; filaments usually shorter than anthers. **Disc** 0 or surrounding ovary. **Ovary** 1-locular, with single ovule; style lateral, included; stigma usually simple, sometimes flattened or 2-lobed, usually penicillate. **Fruit** dry, enclosed in persistent base of calyx tube. **Seeds** small. $x = 9$ (7).

Species ± 140, mainly Africa, few extending to Madagascar and India; ± 97 in sthn Afr., widespread in Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape. Consensus of opinion favours the reduction in the number of genera, mainly because of the variable nature of the differentiating characters.

Lachnaea L. 5460000

Linnaeus: 560 (1753); Wright: 18 (1915); Beyers & Van der Walt: 65 (1995); Beyers: 45 (1997).

Cryptadenia Meisn.: 404 (1840); Wright: 15 (1915).

Shrubs or shrublets. **Leaves** decussate or alternate, sessile or subsessile, entire, amphistomatic or epistomatic. **Flowers** sessile or pedicelled, solitary and terminal or in terminal, indeterminate capitula, or bracteate or ebracteate umbels. **Calyx**: hypanthium circumscissile, portion above plane of circumscission cylindrical to cyathiform, rarely cyathiform with a sigmoid curve at base, scales present below stamen attachment, portion below plane of circumscission ovoid to obovoid. **Sepals** 4, almost equal to distinctly unequal, petaloid. **Petals** 0. **Stamens** 8 in 2 whorls of 4, outer whorl exserted, episepalous or arising from or near rim of hypanthium, inner whorl exserted or semi-exserted, arising from rim to thirdway down hypanthium; filaments variable in length; anthers basifixed, introrse, ellipsoid to oblate-spheroid. **Scales** 8, exserted or enclosed, in single row below antipetalous stamens. **Disc** 0. **Ovary** sessile, 1-locular, with single ovule; style arising laterally; stigma either penicillate or conical or capitate and papillate or capitate and elongate-papillate. **Fruit** an achene, enclosed in persistent base of hypanthium. $x = 9$.

Species 30, Northern, Western and Eastern Cape; greatest diversity in Western Cape.

Passerina L. 5461000

Linnaeus: 559 (1753); Wikström: 319 (1818); Meisner: 561 (1857); Wright: 9 (1915); Thoday: 146 (1924); Domke: 108 (1934); Peterson: 630 (1958); Peterson: 214 (1959a); Friedrich-Holzhammer: 3 (1968); Bond & Goldblatt: 432 (1984); Hilliard & Burtt: 182 (1987).

Chymococca Meisn.: 565 (1857).

Shrublets or shrubs, ericoid, pubescent or tomentose when young. **Leaves** decussate, concave or closely in-

volute, lined with woolly hairs. **Flowers** in terminal spikes or heads, subtended by bracts usually broader than leaves. **Calyx** 4-lobed; tube flask-shaped or subcylindric; lobes spreading, shorter than tube. **Petals** 0. **Stamens** 8, unequal in length, up to length of calyx lobes; 2-thecous, extrorse, opening lengthwise by slits; anemophilous; pollen globose, usually polyforate, pollen wall with a secondary reticulum. **Scales** 0. **Disc** 0. **Ovary** ovoid, 1-locular, with a solitary ovule; style lateral; stigma mop-like, filling mouth of calyx tube. **Fruit** enclosed in persistent base of calyx tube, with membranous or fleshy pericarp. **Seeds** with black, crustaceous testa and curved, beak-like micropyle.

Species ± 20, mostly sthn Afr., mainly in Western and Eastern Cape; 2 extending into Zimbabwe along the eastern escarpment and *Passerina montana* Thoday, rare on mountain tops in Namibia and North-West.

Peddiea Harv. 5434000

Harvey: 265 (1840); Wright: 80 (1915); Peterson: 10 (1978); Breteler: 205 (1994).

Shrubs, glabrous. **Leaves** alternate, subsessile, elliptic or lanceolate. **Flowers** pedicelled, in few-flowered, terminal umbels. **Calyx** 4- or 5-lobed; tube cylindric, ribbed; lobes ovate, spreading, shorter than tube. **Petals** 0. **Stamens** 8–10, in 2 whorls arising from upper portion of calyx tube; anthers subsessile, linear, slightly curved. **Disc** surrounding ovary cup-shaped, entire or irregularly lobed. **Ovary** shortly stipitate, 2(3)-locular, glabrous or hairy on upper part; style terete, as long as ovary; stigma capitate or ± saucer-shaped. **Fruit** fleshy, ± the size of a pea. **Seeds** with papery testa.

Species ± 10, tropical and SE Africa and 1 (endemic) on Madagascar; 1 in sthn Afr.: *Peddiea africana* Harv., in Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape near Komga.

Struthiola L. 5436000

Linnaeus: 4 (1767) name conserved; Wright: 26 (1915); Domke: 135 (1934); Levyns: 599 (1950); Peterson: 33 (1978); Bond & Goldblatt: 433 (1984).

Belvala Adans.: 285 (1773) name rejected.

Shrubs or shrublets. **Leaves** opposite or sometimes alternate, sessile, entire. **Flowers** sessile, solitary, rarely 2, in axils of upper leaves, forming a spike-like inflorescence; bracteoles 2. **Calyx**: hypanthium cylindric, sometimes slightly inflated above, circumscissile just above apex of ovary. **Sepals** 4, equal, petaloid. **Petals** 4, 8, or 12, fleshy, subterete, shorter than sepals, surrounded by stiff hairs. **Stamens** 4, antipetalous, arising from deep in throat of hypanthium, included; anthers subsessile, basifixed, introrse, narrowly ellipsoid, sometimes with an apical appendage. **Scales** 0. **Disc** 0 or surrounding base of ovary. **Ovary** 1-locular, with single ovule; style arising laterally, included; stigma usually penicillate, occasionally subcapitate. **Fruit** an achene, enclosed in persistent base of hypanthium.

Species 42, Northern, Western and Eastern Cape to S KwaZulu-Natal; mostly restricted to the coastal regions.

Synaptolepis Oliv. 5442000

Oliver: 59, t. 1074 (1870); Wright: 79 (1915); Pearson: 245 (1910); Domke: 122 (1934); Peterson: 5 (1978).

Shrubs, erect or scandent. **Leaves** alternate, membranous or subcoriaceous. **Flowers** solitary or fascicled in leaf axils, sessile or shortly pedicelled. **Calyx** 5-lobed; tube cylindric, at length swollen below, not articulated. **Petals** united into a short, erect, entire or obscurely 5-lobed ring at base of calyx lobes. **Stamens** 10, in 2 whorls in throat of calyx and not exceeding corolla; anthers with wide connective. **Disc** of minute scales or shortly cup-shaped and membranous. **Ovary** shortly stalked, 1-locular, with 1 ovule; style slender; stigma cylindric or capitate. **Fruit** dry, enclosed in persistent, ± fleshy base of calyx.

Species 7, Africa; 2 in sthn Afr., Northern Province and mainly KwaZulu-Natal.

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Tiliaceae

[Malvaceae—Grewioideae, fide Bayer *et al.* (1999)](Dilleniidae—Malvales)

Compiled by C.L. Bredenkamp

Annual or perennial herbs, shrubs, or small trees, often stellately hairy. **Leaves** alternate, often in 2 ranks, simple or rarely digitate, entire, toothed, or lobed, often palmately veined, petiolate; stipules paired, usually small and deciduous. **Inflorescence** usually cymose, with cymes often leaf-opposed, sometimes in corymbs or panicles, mostly axillary, sometimes terminal. **Flowers** usually bisexual, regular. **Sepals** (3 or 4)5, free or occasionally connate, usually valvate. **Petals** free, as many as sepals and alternating with them, rarely 0, often with a glandular claw or appendage at base. **Stamens** mostly indefinite, 7 or many; often on a raised torus or androgynophore, free or connate at base, all fertile or outer sterile; anthers dehiscing longitudinally or by terminal pores. **Ovary** superior, 2–10-locular, with 2–many ovules per locule on axile placentas; style 1; stigma entire or lobed at apex or stigmas almost free. **Fruit** a dry or somewhat fleshy drupe or a capsule, 2–10-locular or unilocular by abortion, sometimes transversely septate between seeds. **Seeds** with endosperm.

Genera 48, species 725, ± cosmopolitan but especially abundant in the tropical and subtropical regions; sthn Afr.: genera 4, species 60.

Candolle: 503 (1824); Harvey: 223 (1860); Roessler: 1 (1969); Wild: 1 (1984).

(See note on family circumscription under Malvaceae.)

Key to genera

1a Fruit a somewhat fleshy to dry, (1)2–4-lobed drupe ..... **Grewia**

1b Fruit a glabrous, hairy or densely bristly capsule:

2a Flowers white, pinkish or mauve, 4-merous; some stamens sterile with no anthers or, if sterile stamens very few or apparently absent, the filaments nodose ..... **Sparrmannia**

2b Flowers yellow, 5-merous, sometimes 4-merous but then capsule pod-like; all the stamens fertile, filaments never nodose:

3a Fruits globose, bristly, spiny or with conical, spine-tipped tubercles; ovules 2 per locule ..... **Triumfetta**

3b Fruits usually long and pod-like, rarely ellipsoid or ovoid; ovules more than 2 per locule or, if only 2, then capsule smooth; leaves often tailed at the base ..... **Corchorus**

Corchorus L. 4953000

Linnaeus: 529 (1753); Linnaeus: 234 (1754); Candolle: 504 (1824); Harvey: 228 (1860); Wild: 82 (1963); Wild: 32 (1984); Edmonds: 15 (1990).

Herbs or small shrubs, sometimes with annual stems from a woody rootstock, with simple or stellate hairs. **Leaves** serrate, dentate, repand or lobed with basal teeth often prolonged into long setaceous points; petioles usually more densely pubescent on upper side; stipules lateral, usually setaceous or subacute. **Flowers** in bracteate, pedunculate cymes ± opposed to leaves, or peduncle obsolete. **Sepals** 4 or 5, usually narrow, often caudate at apex. **Petals** as long as sepals, obovate, oblanceolate or linear, yellow, usually with a short basal claw ciliolate on margin. **Stamens** 7–many, filamentous, borne on a very short, glabrous androgynophore which is annular at apex with stamens arising between annulus and ovary. **Ovary** 2–5-locular, with 2 to many axile ovules in each locule; style glabrous; stigma cup-shaped or slightly 2–6-lobed or capitate-fimbriate. **Fruit** an elongated or subglobose capsule, glabrous or hairy, smooth, bristly, or prickly, straight or curved, loculicidally 2–5-valved, sometimes with transverse septa within, 2–many-seeded. **Seeds** dark brown or black, pendulous or horizontal, quadrate, ellipsoid, cylindric or irregularly hemispherical; embryo usually curved; cotyledons flat; endosperm fleshy. $x = 7$ (polyploidy).

Species ± 100, widely distributed through tropics and subtropics; 15 in sthn Afr., in all countries and provinces except Lesotho and Western Cape.

Grewia L. 4966000

Linnaeus: 964 (1753); Linnaeus: 412 (1754); Candolle: 508 (1824); Harvey: 224 (1860); Wild: 1 (1984).

Shrubs or smallish trees. **Leaves** serrate, very rarely entire, 3–7-nerved at base; stipules lateral. **Flowers** in terminal or axillary panicles or in leaf-opposed or axillary umbel-like cymes. **Sepals** 5, linear-oblong or linear-spathulate, stellately hairy outside, coloured like petals within. **Petals** 5, shorter than sepals, yellow, pink, mauve, purplish or white, mostly with a nectariferous claw at base. **Stamens** indefinite, free, usually raised on a torus or androgynophore which is short and glabrous or produced above into a pubescent extension. **Ovary** 2–4-locular, entire or 2–4-lobed, with 2–many axile ovules in each locule; style longer than ovary with subulate or flattened lobes or almost entire. **Fruit** a 1–4-lobed drupe with 1–4 pyrenes; mesocarp somewhat fleshy or fibrous; endocarp hard and woody. $x = 9$ (polyploidy, B-chromosomes).

Species > 400, widely distributed in Africa, Asia and Australia; 27 in sthn Afr., in all countries and provinces.

Sparrmannia L.f. 4957000

Linnaeus: 41 (1782); Candolle: 503 (1824); Harvey: 223 (1860); Wild: 78 (1963); Wild: 29 (1984).

Large shrubs, all parts stellate-pubescent or glabrescent, sometimes with intermixed simple hairs. **Leaves** 3–7-angled or -lobed, palmately nerved, crenate-dentate, crenate or serrate; stipules deciduous, subulate or setaceous. **Flowers** in extra-axillary or leaf-opposed umbels on longish peduncles in upper axils; bracts similar to stipules. **Sepals** 4, lanceolate, deciduous. **Petals** 4, oblanceolate, eglandular. **Stamens** many, with nodose filaments; outer stamens often sterile and moniliform; androgynophore obsolete. **Ovary** 4- or 5-locular; ovules many; style slender, glabrous with a 4- or 5-toothed stigma. **Fruit** a globose, oblong-ovoid or ellipsoid, 4- or 5-valved capsule, covered with rigid bristles. $x = 8$ (high polyploidy).

Species ± 7, confined to Africa and Madagascar; 2 in sthn Afr., Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

Triumfetta L. 4975000

Linnaeus: 444 (1753); Linnaeus: 203 (1754); Candolle: 506 (1824); Harvey: 227 (1860); Wild: 63 (1963); Wild: 20 (1984).

Annual or perennial herbs, suffrutices or shrubs. **Leaves** simple, lobed or digitately divided, serrate or crenate, often several-nerved from base; stipules lateral. **Flowers** borne in cymes in terminal inflorescences or at nodes. **Sepals** 5, usually linear and with a short horn just behind the apex, usually stellately hairy without. **Petals** 5, linear to obovate, narrowed towards base, often hairy at base or just above it, yellow or orange. **Stamens** 4–40, raised on a short, glabrous androgynophore or torus with a glandular patch just above each petal base, apex of androgynophore produced into a ciliate or pubescent or villous disc or annulus between which and the ovary stamens arise. **Ovary** often tubercled or echinulate, each tubercle surmounted by one or more minute bristles; 2–5-locular with 2 pendulous collateral ovules in each locule or falsely 10-locular by the intrusion of longitudinal false septa; style terete, ± as long as stamens; stigma entire or very shortly 2–5-lobed. **Fruit** a usually globose, sometimes ovoid, echinate or setose capsule, indehiscent or dividing into 2–5 valves with 1 or 2 seeds per locule. **Seeds** obovoid or subreniform; testa rather leathery and brown; embryo straight; cotyledons flat, suborbicular; endosperm fleshy, scanty. $x = 8$ (high polyploidy).

Species ± 100, widely distributed in the tropics and subtropics but particularly common in Africa; 10 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Lesotho and Eastern Cape. Many species are weeds of cultivation and waste places and early colonisers of fallows or abandoned cultivation; others are frequent in forest clearings and forest margins; many are used for the production of native fibres.

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Trapaceae

(Rosidae—Myrtales)

Compiled by C.L. Bredenkamp

Floating aquatic herbs. **Adventitious roots** developing from leaf scars of submerged leaves containing chlorophyll, pinnatisect into many filiform segments. **Leaves** dimorphic; floating leaves alternate, forming rosettes, only present at upper nodes, with long spongy petiole ± inflated about middle, lamina deltoid to rhombic, upper margins toothed; submerged leaves opposite, sessile, linear, entire, falling off early; stipules small, scarious, divided to base and thus apparently more than 2 per leaf, linear, elongate, acuminate, deciduous. **Flowers** bisexual, regular, solitary, axillary. **Calyx** 4-lobed; tube oblong, slightly produced above ovary; lobes accrescent, often spinescent, hirsute at first, glabrescent. **Petals** 4, free, subsessile, obovate, white. **Stamens** 4, as long as calyx lobes; anthers oblong, 2-thecous. **Ovary** half-inferior, 2-locular, with a single, pendulous, linear ovule in each locule; style thick, terete, as long as stamens; stigma globose. **Fruit** a 1-seeded, top-shaped, bony or coriaceous drupe, horned with 2–4 persistent calyx lobes. **Seed** solitary, filling fruit; testa woody; cotyledons very unequal, 1 almost vestigial. $x = 6$ or 12 (polyploidy).

Genus 1, Eurasia and Africa; 1 polymorphic species or ± 15, depending on species interpretation.

Linnaeus: 120 (1753); Roessler 96 (1966); Brenan: 346 (1978); Verdcourt: 447 (1986); Verdcourt: 11 (1998).

Trapa L. 5829000

Description as for family.

One polymorphic species: *Trapa natans* L. with 2 varieties in sthn Afr.: var. *bispinosa* (Roxb.) Makino and var. *pumila* Nakano ex Verdc., N Namibia, Botswana and N KwaZulu-Natal.

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Turneraceae

(Dilleniidae—Violales)

Compiled by C.L. Bredenkamp

Herbs, shrublets or shrubs, usually pubescent. **Leaves** alternate, simple, variously incised or entire, sometimes with conspicuous glands or extrafloral nectaries; stipules 0 or small. **Flowers** bisexual, regular, in racemose or cymose, axillary or terminal inflorescences or solitary, opening in the morning, fading at night; pedicels free or rarely adnate to petiole; bracts small; corolla rotate. **Calyx** tubular, 5-dentate or sepals 5 and fused near base, quincuncial. **Petals** 5, free, erect or spreading, contorted in bud, usually with claw arising on calyx tube or near its base, sometimes with a

ligule or small thin corona on upper part of claw. **Stamens** 5, hypogynous or arising on calyx tube; filaments free, of equal or unequal length; anthers bilocular, introrse, with longitudinal slits, basifixed. **Ovary** superior, 1-locular, with 3 parietal placentas; styles 3, usually free, slender, often heterostylous; stigmas multipartite; ovules many to few. **Capsule** ovoid or siliqua-like (resembling Brassicaceae fruits), 3-valved, with 1- or multi-seriate placentas, dehiscent. **Seeds** cylindrical, straight or curved, reticulate or striate, often pitted, on long funicles and enveloped by a white, leaf-like aril.

Genera 9, species ± 90, predominantly South American; also in Africa, the Mascarenes and SE Asia; sthn Afr.: genera 4, species 10.

Harvey: 599 (1862); Fernandes: 15 (1975); Obermeyer: 93 (1976).

Key to genera

1a Annuals or chamaephytes, 100–600 mm tall; flowers in axillary inflorescences or solitary; petals orange-red to pale yellow, claw not dark-coloured; pedicels free:
  2a Flowers on long racemes; capsule resembling a siliqua of the Brassicaceae, long, thin, terete, rostrate; seeds straight, cylindrical ..... **Tricliceras**
  2b Flowers solitary or in short, few-flowered racemes; capsule ovoid; seeds curved:
    3a Calyx long-tubular; petals not clawed; capsule erect, narrowly ovoid, beaked, thin-walled; leaves without 1 or 2 pairs of sessile glands below ..... **Streptopetalum**
    3b Calyx: sepals fused in lower third, forming a cup; petals clawed, alternating with sepals; capsule recurved, ovoid, woody; leaves with 1 or several pairs of round sessile glands below on lower half of leaf ..... **Piriqueta**
1b Shrubs up to 2 m tall with axillary, solitary flowers; petals orange or yellow with a dark brown or purplish black claw; pedicels fused to petiole ..... **Turnera**

Piriqueta Aubl. 5357000

Aublet: 298 (1775); Urban: 57 (1883); Obermeyer: 98 (1976).

Erblichia Seem.: 130, t. 27 (1854).

Small shrublets, variously pubescent with simple hairs, aromatic. **Leaves** subsessile, serrate, with large, sessile, circular glands on lower surface; stipules minute or 0. **Flowers** solitary, axillary. **Calyx**: sepals fused in lower third, forming a cup. **Petals** arising in throat of calyx tube, obovate, clawed, alternating with calyx lobes and together forming a fimbriate annulus in the throat. **Stamens** hypogynous, with long or short filaments. **Ovary**: ovules many, uni- to multi-seriate; styles 3, heterostylous. **Capsule** globose, hairy. **Seed** straight or slightly curved, reticulate; aril unilateral, as long as or shorter than seed. $x = 7$ (polyploidy).

Species ± 20, mostly South American, warm parts of Africa and Madagascar; 1 in sthn Afr.: *Piriqueta capensis* (Harv.) Urb., widespread in Northern Province, Gauteng, Mpumalanga, Swaziland and KwaZulu-Natal.

Streptopetalum Hochst. 5356000

Hochstetter: 665 (1841); Urban: 55 (1883); Schreiber: 2 (1968); Obermeyer: 98 (1976).

Small glandular-pubescent annuals or perennials becoming woody at base. **Leaves** sessile, serrate; stipules 0. **Flowers** in few-flowered axillary racemes. **Calyx** forming a long, narrow tube, hairy on outside and within in lower half. **Petals** convolute in bud, arising in throat of calyx, spathulate, yellow or orange. **Stamens** perigynous, equal, or unequal in length, reaching to mouth of tube. **Ovary** oblong-ovoid, pubescent; ovules pluriseriate; styles filiform, just over-topping stamens. **Capsule** ellipsoid, splitting to base, glandular-hispid. **Seeds** sausage-shaped; testa reticulate, pits with 2 pores; aril unilateral, as long as, or shorter than seed, with a wavy margin.

Species 3, African; 1 species: *Streptopetalum serratum* Hochst., recorded from Ethiopia to Namibia, Botswana, Northern Province and Mpumalanga.

Tricliceras Thonn. ex DC. 5355000

Candolle: 56 (1826); Fernandes: 15 (1975); Obermeyer: 453 (1978).

Wornskioldia Thonn.: 165 (1827); Schreiber: 3 (1968); Obermeyer: 93 (1976).

Annuals or perennials (often chamaephytes), variously hispid and often glandular-pubescent. **Leaves** linear to narrowly ovate, usually serrate or lobulate to deeply incised; stipules small or 0. **Flowers** in simple, secund, few- to many-flowered racemes with apical part recurved in bud, accrescent and erect with age, flowers developing one after the other; scape long and thin; pedicels short, somewhat accrescent and often recurved in fruit; bracts small; a few sterile bracts often present on rachis. **Calyx** usually setiferous on outside, pubescent in lower half inside. **Petals** obovate, unguiculate, yellow, orange-red or white; claw appressed to calyx tube in upper half, fused to it below; with a ligule or small pustule on upper part of claw. **Stamens** hypogynous, reaching to throat; filaments filiform, sometimes narrowly winged, occasionally 3 shorter; anthers oblong. **Ovary** ellipsoid; styles erect, heterostylous; stigmas apical, small, multipartite. **Capsule** resembling a siliqua of Brassicaceae, terete, usually long and thin, often constricted between the uniseriate seeds, rostrate. **Seeds** straight, terete, obtuse, reticulate, usually with 2 pores in each cavity; aril unilateral, short.

Species ± 11, tropical and subtropical Africa; 7 in sthn Afr., in Namibia, Botswana, Northern Province, North-West, Mpumalanga, KwaZulu-Natal and Eastern Cape.

Turnera L. 5360000

Linnaeus: 271 (1753); Urban: 81 (1883); Schreiber: 2 (1968); Obermeyer: 102 (1976).

Shrubs, pubescent. **Leaves** shortly petiolate, toothed, often with 2 basal glands on lower side at base, pubescence simple or stellate; stipules minute or 0. **Flowers** solitary, axillary; peduncle fused to petiole; bracts 2, filiform. **Calyx**: lobes pubescent with a membranous glabrous margin. **Petals** arising in calyx throat, shortly clawed. **Stamens** arising below petals, sometimes hypogynous. **Ovary** ovoid to cylindrical; ovules pluriseriate; styles spreading; stigmas fimbriate. **Capsule** globose to ovoid. **Seeds** globose to obovoid or cylindrical and curved, reticulate; aril membranous, often longer than seed. $x = 5$ (7, 13) (high polyploidy).

Species ± 100, mostly South American; 1 in sthn Afr.: *Turnera oculata* Story with 2 varieties, endemic in N Namibia.

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Ulmaceae

(Dilleniidae—Urticales)

Compiled by M. Jordaan

Trees or shrubs, deciduous or rarely evergreen, with or without spines; plants monoecious, dioecious, polygamous or with all flowers bisexual. **Leaves** alternate, rarely opposite, usually distichous, simple, often asymmetrical at base, usually 3-nerved at base, entire or serrate, crenate or dentate, petiolate; stipules paired, lateral, interpetiolar, or intrapetiolar, free or connate, usually caducous. **Inflorescences** axillary, cymose, racemose, paniculate, fasciculate, or the female flowers solitary. **Flowers** unisexual or bisexual, regular to slightly irregular, hypogynous or perigynous, small, inconspicuous. **Perianth** 1-whorled; tube subcampanulate; lobes (2–)4–6(–9), free or connate, imbricate or valvate, persistent. **Petals** 0. **Stamens** as many as perianth lobes and opposite them, or rarely twice as many, or up to 16, free or adnate to perianth tube; filaments arising from perianth tube, erect in bud; anthers 2-thecous, dehiscing longitudinally, dorsifixed and often ± versatile; pistillode usually present in male flowers; staminodes present or absent in female flowers. **Ovary** superior; carpels 2 or 3, connate, sessile or stipitate, 1-locular or rarely 2-locular (in *Ulmus* spp.), often surrounded at base by a ring of hairs; ovule solitary in each locule, pendulous from apex, anatropous or amphitropous, bitegmic, crassinucellar; styles 2, divergent, branches linear, simple or bifurcate, stigmatose on their inner face. **Fruit** a drupe, samara, or nut-like, dry or thinly fleshy, often winged or appendiculate. **Seed** 1, arils absent; endosperm absent or scanty, consisting of 1 layer of thick-walled cells; embryo straight or curved.

Genera ± 16, species ± 150, tropical to temperate regions, especially north temperate zone; sthn Afr.: genera 4 (1 exotic), species 5 indigenous, several exotic.

Mirbel: 905 (1815); Link: (1831); Planchon: 244 (1848); Planchon: 151 (1873); Melchior: 52 (1964); Polhill: 1 (1966); Chernik: 1561 (1975); Wilmot-Dear: 1 (1991); Todzia: 603 (1993); Zavada & Kim: 13 (1996).

Ulmaceae Mirbel (1815) is frequently divided into two subfamilies, Ulmoideae (*Ulmus*) and Celtidoideae (*Celtis*, *Chaetachme* and *Trema*), see Melchior (1964), Chernik (1975), Cronquist (1981). They are sometimes regarded as families: Ulmaceae and Celtidaceae Link (1831), Grudzinskaya (1967).

Key to genera

1a Plants without spines; stipules free:
  2a Ovary sessile; fruit a thinly fleshy drupe; embryo curved:
    3a Leaves serrate almost from the base; male flowers with induplicate-valvate perianth lobes; styles 0.5–1(2) mm long.. ..... **Trema**
    3b Leaves entire, coarsely toothed or serrate in the upper two-thirds; male flowers with imbricate perianth lobes; styles 2–5 mm long ..... **Celtis**
  2b Ovary stipitate, compressed; fruit a flat samara with the wing surrounding the fruit; embryo straight ..... ***Ulmus**
1b Plants with axillary spines; stipules connate along one margin ..... **Chaetachme**

Celtis L. 1898000

Linnaeus: 1043 (1753); Linnaeus: 467 (1754); Adanson: 377 (1763); Jussieu: 408 (1789); Planchon: 168 (1873); Bentham: 354 (1880); Engler: 63 (1889); Rendle: 3 (1916); Brown: 517 (1925); Polhill: 139 (1964); Polhill: 4 (1966); Polhill: 266 (1989); Wilmot-Dear: 6 (1991).

Deciduous trees or rarely shrubs; crown spreading, branches without spines; bark mostly grey and smooth, sometimes brown and fissured; plants monoecious or rarely polygamonoecious. **Leaves** alternate, usually asymmetrical at base, dentate to entire, 3–5-nerved from base to penninerved, cystoliths often present, giving scabrous texture to mature leaves, petiolate; stipules small, lateral, free, caducous. **Inflorescences**: male inflorescences cymose or fasciculate; female axillary, solitary or few-flowered clusters. **Flowers** usually unisexual, male and female on same plants, along with a few bisexual flowers, pedicellate on branches of current year, appearing with leaves in mid- or late spring. **Perianth**: lobes 4 or 5. **Male flowers** globular; perianth lobes imbricate in bud, free, recurved at anthesis; stamens 4 or 5, with filaments arising on pilose receptacle, connate at base, incurved in bud, exserted after anthesis; anthers dorsifixed, extrorse, ovate; ovary rudimentary or absent. **Female flowers** with staminodes usually present; ovary 1-locular, ovoid, sessile; style short, sessile, divided into 2 divergent, elongate, widely spreading or ascending lobes, lobes entire or 2-fid. **Fruit** a fleshy drupe, ovoid or globose; outer mesocarp thick, firm, inner mesocarp thin, fleshy; endocarp thick-walled, bony, smooth or rugose, persisting after leaves fall. **Seed** without endosperm; embryo curved; cotyledons broad. $x = 5$ (aneuploids, high polyploidy).

Species ± 60, widespread in tropical and temperate regions mostly of the northern hemisphere; fewer than 10 in Africa; 3 in sthn Afr., the northern provinces, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape. Alien species such as **Celtis australis* L. (Nettle tree) and **C. sinensis* Pers. (Chinese hackberry), sometimes found as garden escapes, may be confused with the local species.

Chaetachme Planch. 1906000

Planchon: 266 & 360 (1848); Engler: 66 (1889); Brown: 520 (1925); Polhill:144 (1964); Polhill: 12 (1966); Wilmot-Dear: 1 (1991).

Trees with dense canopies or vigorous shrubs with tendency to scramble; branches with straight, sharp, tough, axillary spines, often paired; young branches often zigzagging; plants monoecious or dioecious. **Leaves** alternate, entire on young plants, singly serrate on mature plants, pinnately veined, glabrous, minutely punctate on lower surface, scabrous when mature, apex with hair-like bristle at tip, base slightly asymmetric, shortly petiolate; stipules large, connate along one margin, enclosing terminal bud, caducous. **Inflorescences** many-flowered axillary cymes or panicles, usually congested, male or with 1(2) females near base; remaining female flowers solitary and in upper axils. **Flowers** unisexual, greenish, subtended by small, ovate, ± amplexicaul bracts. **Perianth**: lobes 5, deeply concave, with inflexed sides, with male buds induplicate-valvate, and female buds imbricate. **Male flowers** with 5 stamens, included in cavity of perianth lobes; pistillodes present. **Female flowers** with 1 perianth lobe smaller than others, without staminodes. **Ovary** 1-locular, pubescent, sessile; styles 2, long, unbranched, divaricate, densely hairy-stigmatose, persistent. **Fruit** a drupe, thinly fleshy, globose; endocarp stony. **Seed** without endosperm; embryo curved. $x = 10$ (aneuploids).

Species 4 (?), confined to tropical and sthn Afr. and Madagascar; 1 in sthn Afr.: *Chaetachme aristata* Planch., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Eastern Cape and as far south as Knysna in the Western Cape.

Trema Lour. 1902000

Loureiro: 562 (1790); Bentham: 355 (1880); Engler: 65 (1889); Rendle: 12 (1916); Brown: 519 (1925); Polhill: 143 (1964); Wilmot-Dear: 3 (1991).

Trees or shrubs; branches without spines; plants monoecious, dioecious or polygamous. **Leaves** alternate, crenate to serrate, ± scabrous, often 3-nerved and asymmetrical at base, petiolate; stipules lateral, paired, free, caducous. **Inflorescences** compact to lax axillary cymes or fascicles, 12–20-flowered, or flowers solitary. **Flowers** mostly unisexual, yellowish green, appearing after leaves on new stems. **Perianth**: lobes 4 or 5, shortly connate at base, subequal or outer slightly smaller, induplicate-valvate in bud. **Stamens** 5, rarely 4; filaments shorter than perianth lobes, erect. **Ovary** 1-locular, sessile, surrounded by a ring of hairs at base; styles 2, short, divaricate or incurved, unbranched, ± persistent. **Fruit** a drupe, ovoid to subglobose and compressed; exocarp succulent; endocarp hard. **Seed** with or without endosperm; cotyledons falcate, thick and narrow. $x = 10$ (high polyploidy, B-chromosomes).

Species ± 15, in tropical and subtropical regions of Old and New World; only 1 present in tropical and sthn Afr.: *Trema orientalis* (L.) Blume, Namibia, Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

*Ulmus L. 1896000

Linnaeus: 225 (1753); Linnaeus: 106 (1754); Adanson: 377 (1763); Jussieu: 408 (1789); Bentham: 351 (1880); Engler: 62 (1889); Tutin: 65 (1964); Todzia: 608 (1993); Zavada & Kim: 13 (1996); Sherman-Broyles: 369 (1997).

Deciduous trees, rarely shrubs, up to 40 m tall, with usually deeply furrowed bark; branches without spines. **Leaves** singly or doubly serrate, pinnately veined, base usually asymmetric, glabrous, petiolate; stipules free, falling early. **Inflorescences** fascicles, racemes, or cymes, pedunculate or subsessile, subtended by 2 bracts. **Flowers** bisexual (rarely unisexual), pedicellate or sessile, on branches of previous season, appearing in spring before leaves. **Perianth** slightly to deeply (4)5(–9)-lobed. **Stamens** equal in number and opposite perianth lobes, usually exserted; anthers reniform, extrorse. **Ovary** sessile or stipitate, compressed; styles short, deeply 2-lobed, persistent. **Fruit** a flattened samara, with membranous wings. **Seed** ovate, compressed; endosperm a single layer of thick-walled cells; embryo straight; cotyledons flat or slightly convex, fleshy. $x = 7$ (high polyploidy).

Species ± 30, temperate and boreal regions of the northern hemisphere; the centre of distribution is apparently central and N Asia; 2 species in sthn Afr. have been cultivated as ornamentals and occur as escapes, notably **Ulmus parvifolia* Jacq. (Chinese elm) and **U. procera* Salisb. (English elm).

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Urticaceae

(Dilleniidae—Urticales)

Compiled by M. Jordaan

Annual or rhizomatous perennial herbs, subshrubs, shrubs, sometimes small trees or climbers with soft wood, clear sap, often tough, fibrous bark, occasionally with stinging hairs, but also frequently with stiff nonstinging hairs, which may be curled or sharply hooked; cystoliths usually punctiform, elongated or linear in epidermal cells; plants monoecious or dioecious, or rarely polygamous. **Leaves** alternate or opposite, sometimes anisophyllous, simple or 3–5(–7)-lobed, entire, serrate or dentate, usually with 3 subequal nerves from base reaching towards leaf apex, petiolate or sessile; stipules usually present, lateral or often intrapetiolar and connate. **Inflorescences** axillary or terminal, extremely varied, mostly pedunculate, lax or condensed racemes, often with flowers in small cymose glomerules, or sessile and condensed cymes in leaf axils, partial inflorescences often subtended by involucral bracts. **Flowers** unisexual or rarely bisexual, regular or (especially in female flowers) irregular, hypogynous, minute; perianth 1-whorled; tepals 1–5, or rarely female flowers naked, free or ± connate, imbricate or valvate, persistent; pedicel often articulated below perianth. **Male flowers** usually pedicellate, white or green, with stamens as many as tepals and opposite them, free or connate in lower half, rarely completely fused and split along one side; filaments broadened at base and inflexed in bud, suddenly reflexing and ejecting pollen; anthers basifixed, dehiscing by longitudinal slits; rudimentary ovary frequently present. **Female flowers** usually sessile, greenish or reddish, with 3–5 tepals, free or ± completely connate, often very unequal, often accrescent after pollination, rarely rudimentary or completely absent; staminodes, if present, rudimentary or scale-like and important for dispersal of fruit (ejecting achene when reflexing); ovary superior, unicarpellate, often oblique or asymmetrical, 1-locular, placentation basal; ovule solitary, erect, orthotropous, bitegmic, crassinucellate; style present or stigma sessile; stigma 1, capitate, penicillate, ligulate or filiform, linear. **Fruit** a dry achene, sometimes enclosed by persistent, accrescent perianth which may become fleshy. **Seed** with thin testa, not fused to endocarp; endosperm ± copious, thin, oily or starchy; embryo straight and small.

Genera ± 50, species ± 1 000, widely distributed in the tropical and, with fewer species, in temperate regions; sthn Afr.: genera 11, species 22.

Jussieu: 400 (1789), under Urticae; Endlicher: 282 (1837); Weddell: 1 (1856); Weddell: 401 (1857); Weddell: 32 (1869); Bentham: 341 (1880); Engler: 98 (1888); Roessler: 1 (1967); Friis: 79 (1991); Friis: 612 (1993).

Classification of Urticaceae (after Mabberley 1997)

1. Tribe **Urticeae** (Stinging hairs; trees to herbs): *Girardinia*, *Laportea*, *Obetia*, *Urera*, *Urtica*
2. Tribe **Lecantheae** (No stinging hairs; perianth of female flowers 3-lobed; stigma like a paint brush): *Pilea*
3. Tribe **Boehmerieae** (No stinging hairs; stipules developed): *Pouzolzia*
4. Tribe **Parietarieae** (No stinging hairs; stipules frequently absent): *Parietaria*
5. Tribe **Forsskaoleae** (No stinging hairs; male flowers with only 1 stamen): *Didymodoxa*, *Droguetia*, *Forsskaolea*

Key to genera

1a Plants with stinging hairs, at least on the inflorescences and petioles:
- 2a Leaves opposite ..... **Urtica**
- 2b Leaves alternate:
  - 3a Stipules free, lateral; shrubs or small trees with soft wood ..... **Obetia**
  - 3b Stipules fused, intrapetiolar; woody climbers or erect, short-lived or perennial herbs:
    - 4a Woody climbers with adventitious or axillary roots from climbing stems; stinging hairs mostly restricted to petioles and inflorescences; female perianth with tepals accrescent, becoming fleshy and orange or red in fruit; stipules soon deciduous ..... **Urera**
    - 4b Erect, short-lived or perennial herbs, not climbing and without adventitious or axillary roots from the stems; usually with stinging hairs on all aerial parts of plant; female perianth membranous in fruit:
      - 5a Female perianth of 3 ± completely connate tepals (sometimes also with 1 minute free tepal, forming a 1-sided cover on the ovary or achene), stinging hairs often longer than 5 mm and very dense ..... **Girardinia**
      - 5b Female perianth of 4 free, very unequal tepals; stinging hairs mostly shorter than 5 mm, moderately dense to sparse ..... **Laportea**

1b Plants completely without stinging hairs:
- 6a Leaves opposite:
  - 7a Flowers all free, not enclosed in involucre; male flowers with 2–4 stamens; stipules fused, interpetiolar ..... **Pilea**
  - 7b Flowers enclosed in an involucre; male flowers with only 1 stamen; stipules free, lateral ..... **Droguetia**
- 6b Leaves alternate:
  - 8a Stipules absent; leaves with entire margin; very delicate herbs ..... **Parietaria**
  - 8b Stipules present, lateral and free; leaves entire or toothed; delicate to coarse herbs:
    - 9a Flowers all free, none enclosed in an involucre of bracts:
      - 10a Male flowers with 4 or 5 stamens; female flowers with a tubular perianth; annual or perennial herbs or shrubs.. ..... **Pouzolzia**
      - 10b Male flowers with 1 stamen; female flowers without a perianth; delicate annual herbs ..... **Didymodoxa**

9b Flowers enclosed in an involucre of bracts:
11a Coarse herbs; lobes of involucre much longer than flowers ..... **Forsskaolea**
11b Delicate herbs; lobes of involucre much shorter than flowers ..... **Droguetia**

Didymodoxa E.Mey. ex Wedd. 2014010

Weddell: 547 (1856); Weddell: 235[61] (1869); Friis: 209 (1985); Friis *et al.*: 126 (1987); Friis & Wilmot-Dear: 45 (1988); Friis: 60 (1989a); Friis: 114 (1991); Friis: 628 (1993).

Australina in sense of other authors, not of Gaudich.; Rendle: 305 (1917); Brown: 552 (1925).

Prostrate, ascending or erect, slender annual herbs, often much branched from all parts of main stem, without stinging hairs; plants monoecious or dioecious by abortion. **Leaves** alternate, but lower 1 or 2 pairs often opposite, serrate, crenate or entire, petiolate, with dot-like cystoliths; stipules lateral, free. **Inflorescences** axillary, sessile, with free, often ciliate or bristle-bearing bracts, usually shorter than densely clustered flowers. **Male flowers** few together, sessile or subsessile; perianth boat-shaped, sometimes almost bract-like, split along one side, with erect tip and slightly connate cylindrical base; stamen 1; rudimentary ovary 0. **Female flowers** few, sessile, with perianth 0; ovary erect, with a subcapitate or shortly linear style; stigma filiform or linear. **Achene** slightly winged along one side, other side rounded; frequently 2 ovaries or achenes joining along rounded side to form a double fruit twice the size of two single fruits. **Seeds** both developing, with thin coat.

Species 2, mountains of eastern tropical Africa, as far north as N Ethiopia; 2 in sthn Afr., Namibia, Northern Province, Gautcng, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

Droguetia Gaudich. 2013000

Gaudichaud-Beaupré: 505 (1830); Gaudichaud-Beaupré: t. 114 (1844); Weddell: 538 (1857); Weddell: 235[57] (1869); Bentham: 394 (1880); Englcr: 117 (1888); Brown: 558 (1925); Friis: 209 (1985); Friis *et al.*: 126 (1987); Friis & Wilmot-Dear: 36 (1988); Friis: 56 (1989a); Friis: 112 (1991); Friis: 628 (1993).

Didymogyne Wedd.: 207 (1854). *Droguetia* section *Didymogyne* (Wedd.) Benth.: 394 (1880).

Slender annual or perennial herbs, occasionally subshrubs, with erect or prostrate stems, ± scabrid-pubescent, without stinging hairs; plants monoecious or sometimes dioecious. **Leaves** alternate or opposite, ovate, crenate-serrate, 3-nerved, petiolate, with dot-like cystoliths; stipules lateral, free. **Inflorescences** broadly campanulate with many crowded flowers, surrounded by a dentate involucre. **Male flowers** many at margin of inflorescence, subsessile, shortly pubescent; perianth clavate in bud, split along one side, unequally 3-toothed; stamen 1; rudimentary ovary 0. **Female flowers** 1 or few, in middle of inflorescence, naked, pedicellate; ovary straight, covered with a woolly tomentum; stigma sessile, filiform, shortly papillose on one side, persistent during ripening; staminodes 0. **Achene** enclosed in persistent involucre, brown, shiny, woolly or smooth, ovoid, compressed, often crowned by persistent stigma. **Seed** with thin coat. $x = 12$ (1 report).

Species 7, in the mountains of east tropical Africa, Madagascar, Mascarenes, South India, Java; 2 in sthn Afr., Northern Province, KwaZulu-Natal, Western and Eastern Cape.

Forsskaolea L. 2012000

Linnaeus: 17 (1764); Linnaeus: 72 (1767); Forsskål: 82 (1775); Jussieu: 403 (1789); Endlicher: 285 (1837); Weddell: 532 (1857); Weddell: 235[54] (1869); Bentham: 393 (1880); Engler: 117 (1888); Brown: 556 (1925); Roessler: 17 (1967); Merxmüller & Roessler: 263 (1980); Friis & Wilmot-Dear: 34 (1988); Friis: 54 (1989a); Friis: 628 (1993).

Slender herbs or small subshrubs, often with rigid indumentum, without stinging hairs; plants monoecious. **Leaves** alternate, toothed, petiolate, often whitish-tomentose beneath, with midrib branching into 3; arachnoid tomentum present; with dot-like cystoliths; stipules lateral, free. **Inflorescences** with flowers crowded within a tubular-campanulate 3–6-partite involucre, densely covered with woolly hairs. **Male flowers** many at periphery of inflorescence, stalked; perianth club-shaped in bud, becoming irregularly 3-lobed or 3-toothed; terminal lobe inflexed; stamen 1; rudimentary ovary 0. **Female flowers** sessile, 1–5 in centre of male involucre; perianth 0; ovary straight; stigma filiform, papillose-hispid, long-persistent. **Achene** ovate in outline, compressed, woolly, enclosed in involucre. **Seed** with thin coat; endosperm scanty. $x = 11$ (1 report).

Species 6, Canary and Cape Verde Islands, S Spain, India, North and South Africa; 3 in sthn Afr., mainly Namibia and Northern Cape, also Western Cape.

Many orthographic variants of the name *Forsskaolea* exist in the literature.

Girardinia Gaudich. 1983000

Gaudichaud-Beaupré: 498 (1830); Endlicher: 283 (1837); Weddell: 163, t. 2B (1856); Weddell: 100 (1869); Bentham: 384 (1880); Engler: 107 (1888); Rendle: 265 (1917); Friis: 143 (1981); Friis: 12 (1989a); Friis: 85 (1991); Friis: 621 (1993).

Erect, annual or short-lived perennial herbs, with long stinging hairs on all aerial parts; plants monoecious or dioecious by abortion. **Leaves** alternate, elliptic to ovate, mostly variously divided, coarsely serrate or lobed, always 3-nerved, petiolate, with dot-like cystoliths; stipules intrapetiolar, connate, often large. **Inflorescences** simple or paniculate spikes, axillary and solitary or paired, male often long, slender with flowers clustered on rachis; female sessile, very densely branched, armed with stinging hairs. **Male flowers** pedicellate; tepals 4 or 5, ovate, concave, valvate in bud; bud depressed; stamens as many as tepals; ovary rudimentary. **Female flowers** sessile, with 3 almost completely connate tepals ± enclosing ovary, split to base on one side, sometimes with 1 minute free tepal; staminodes 0; ovary ± asymmetrical, reflexed, laterally compressed; ovule erect from base; stigma subulate to filiform, acute, very minutely papillose. **Achene** broad, oblique, much compressed, rugose, with remains of persistent perianth at base. $x = 10, 12$ (B-chromosomes).

Species 2, mountains of Old World tropics, from West Africa, Madagascar, Asia to SE China; 1 in sthn Afr.: *Girardinia diversifolia* (Link) Friis, Northern Province and Mpumalanga.

Laportea Gaudich. 1980000

Gaudichaud-Beaupré: 498 (1830) name conserved; Weddell: 121 (1856); Weddell: 77 (1869); Bentham: 383 (1880); Engler: 106 (1888); Chew: 200 (1965); Letouzey: 121 (1968); Chew: 111 (1969); Chew: 72 (1989); Friis: 15 (1989a); Friis: 88 (1991); Friis: 620 (1993).

Fleurya Gaudich.: 497 (1830); Brown: 545 (1925).

Perennial or annual herbs or shrubs, erect, with stinging and nonstinging hairs; plants monoecious or dioecious. **Leaves** alternate, dentate or serrate, 3-nerved from base, petiolate, with linear cystoliths, some species with axillary bulbils; stipules obsolete, rarely intrapetiolar, free or

± connate and bifid, deciduous. **Inflorescences** axillary and terminal, cymose-dichotomous panicles or rarely simple racemes, pedunculate. **Flowers** unisexual or rarely androgynous, reflexed; bracts 0. **Male flowers** usually pedicellate, regular; tepals 4 or 5, distinct, equal; stamens equalling tepals in number; filaments reflexed; rudimentary ovary present, globose or subclavate. **Female flowers** pedicellate; pedicel sometimes winged; tepals 2–4, unequal, lateral pair usually much larger than median pair, and median pair of unequal size; staminodes 0; ovary straight when young, becoming oblique; style persistent in fruit, hood-like or elongate; stigma obliquely ovate or linear, becoming inflexed and hooked, shortly papillose, sometimes with 2 minute lobes at base. **Achene** stipitate, oblique, laterally compressed, ± orbicular, free from and not enclosed by slightly enlarged tepals. **Seed** with a thin coat. $x = 10, 13$ (polyploidy).

Species ± 50, pantropical but extending into temperate regions of North America and East Asia; 3 in sthn Afr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Western and Eastern Cape.

Obetia Gaudich. 1979000

Gaudichaud-Beaupré: t. 82 (1844); Weddell: 106, t. 1B (1856); Weddell: 69 (1869); Bentham: 382 (1880); Engler: 106 (1888); Rendle: 244 (1917); Roessler: 5 (1967); Friis: 221 (1983); Friis: 10 (1989a); Friis: 85 (1991).

Small trees or shrubs, with stinging hairs on younger parts; stems and branches thick and with soft wood; plants dioecious. **Leaves** alternate, simple, often palmately or pinnately lobed, large, cordate at base, petiolate, with dot-like cystoliths; stipules lateral, free, almost foliaceous, persistent for some time. **Inflorescences** mostly in axils of fallen leaves, appearing before new leaves; male inflorescences smaller than female ones. **Flowers** pedicellate, clustered in branched, bracteate panicles. **Male flowers** regular; tepals 5, concave, valvate; stamens 5; ovary rudimentary. **Female flowers** irregular; tepals 4, with inner pair of segments larger than outer pair, accrescent; staminodes 0; ovary at first erect, soon oblique; stigma oblong, soon oblique, papillate. **Achene** compressed, ovoid to orbicular, partially enveloped in thinly membranous, persistent tepals.

Species ± 8, east tropical and sthn Afr., Madagascar, the Mascarenes and Aldabra Islands; most species occur in dry habitats; 2 in sthn Afr., Namibia, Botswana, Northern Province, E North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Parietaria L. 2007000

Linnaeus: 1052 (1753); Linnaeus: 471 (1754); Jussieu: 404 (1789); Endlicher: 284 (1837); Weddell: 503 (1857); Weddell: 235[41] (1869); Bentham: 383 (1880); Engler: 115 (1888); Rendle: 296 (1917); Ball: 68 (1964); Friis: 52 (1989a); Friis: 627 (1993).

Minute annual or perennial herbs, erect, ascending, or decumbent, indumentum often of hooked and straight, nonstinging hairs on all parts of plant; plants monoecious or polygamous. **Leaves** alternate, chartaceous, entire, 3-nerved, with dot-like cystoliths, petiolate; stipules 0. **Inflorescences** of small, axillary clusters or cymules; lateral flowers with an involucre of leafy bracts. **Flowers** bisexual or unisexual. **Male flowers** with 3 or 4 distinct, ascending tepals; stamens as many as tepals; rudimentary ovary present. **Female flowers** with 3 or 4 tepals; ovary free within perianth, glabrous, ± pubescent or lanate; ovules erect from base; style short or obsolete, persistent or not; stigma linear, recurved, densely penicillate, deciduous. **Bisexual flowers** with tepals and stamens as in males, pistil as in females. **Achene** stipitate, ovoid, smooth, brown, loosely enclosed by persistent, enlarged tepals. $x = 7, 8, 10, 13$ (polyploidy).

Species ± 20, subcosmopolitan in temperate and subtropical regions; 1 in sthn Afr.: *Parietaria micrantha* Ledeb., mountains of KwaZulu-Natal, Lesotho and Eastern Cape.

Pilea Lindl. 1984000

Lindley: t. 4 (1821) name conserved; Endlicher: 284 (1837); Weddell: 172, t. 6. C 7 & 8 (1856); Weddell: 104 (1869); Bentham: 384 (1880); Engler: 108 (1888); Rendle: 269 (1917); Brown: 549 (1925); Ball: 68 (1964); Friis: 25 (1989a); Friis: 557 (1989b); Friis: 96 (1991); Friis: 622 (1993).

Annual or perennial herbs; stems simple or branched, erect, sometimes creeping or diffuse, often juicy, translucent and turgescent, without stinging hairs; plants monoecious or dioecious by abortion. **Leaves** opposite, pairs equal or very unequal, entire or dentate, petiolate, with linear cystoliths; stipules intrapetiolar, completely connate. **Inflorescences** axillary cymes, either dense and head-like or lax and paniculately branched, or flowers solitary; bracts small, rarely few and larger, deltate to linear. **Flowers** unisexual, male and female flowers in same cyme. **Male flowers**: tepals (2–)4, concave, subvalvate, sometimes connate into a truncate cup, often mucronate or appendaged on back; stamens as many as tepals; rudimentary ovary conical or oblong. **Female flowers**: tepals 3, equal, or sometimes 1 tepal enlarged and gibbous or hood-like; staminodes 3, opposite tepals, scale-like, minute or inconspicuous, under tension and ejecting mature achene; ovary straight; stigma sessile, composed of a dense tuft of short hairs, deciduous. **Achene** sessile, laterally compressed, slightly oblique, ovate to orbicular, ± smooth, free from perianth at maturity, not or only partly enclosed by hood-like tepal. **Seed** with thin coat; embryo with large cotyledons. $x = 10, 12, 13$ (polyploidy).

Species ± 250, almost pantropical in distribution and in most subtropical regions with exception of Australia and New Zealand; 2 in sthn Afr.: *Pilea rivularis* Wedd. indigenous in the Northern Province and **P. microphylla* (L.) Liebm., a species with very small, 1–8 mm long, entire leaves, a native of tropical America, is cultivated as an ornamental garden plant or occurs as a garden weed, e.g. in KwaZulu-Natal.

Pouzolzia Gaudich. 1992000

Gaudichaud-Beaupré: 503 (1830); Weddell: 389 (1856); Weddell: 412 (1857); Weddell: 219 (1869); Bentham: 387 (1880); Engler: 112 (1888); Rendle: 287 (1917); Brown: 550 (1925); Friis & Jellis: 587 (1984); Friis: 46 (1989a); Friis: 108 (1991); Friis: 623 (1993); Wilmot-Dear & Friis: 61 (1995).

Annual or perennial herbs, shrubs or small trees; stems erect or scandent, finely pubescent, without stinging hairs; plants monoecious, rarely dioecious. **Leaves** alternate, rarely lower ones opposite, simple, chartaceous, entire, often 3-nerved from base, petiolate, upper ones often becoming gradually smaller, passing into bracts, with dot-like cystoliths; stipules lateral, free, often persistent. **Inflorescences** of compact, axillary bisexual glomerules, branched or unbranched. **Flowers** single, either in axils of unmodified leaves or subtended by reduced, bract-like leaves; each flower subtended by a triangular chaffy reddish bract. **Male flowers** pedicellate, with 3–5 tepals; stamens 3–5, concave or abruptly inflexed and dorsally transversely plicate, opposite tepals; ovary rudimentary, clavate or oblong in outline. **Female flowers** sessile, with an indefinite number of completely connate tepals enclosing ovaries; staminodes 0; ovary included; stigma sessile, filiform, villous on one side, soon deciduous. **Achene** ± compressed-ovoid, completely enclosed in enlarged, withered or scarcely changed membranaceous tepals; pericarp shiny, smooth, fawn, brown or white. **Seed** with thin coat. $x = 8, 10, 11, 13$ (polyploidy).

Species ± 35–40, mainly in the Old World tropical regions, occurring in both dry and humid habitats; 2 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Urera Gaudich. 1978000

Gaudichaud-Beaupré: 496 (1830); Weddell: 143, t. 2A (1856); Weddell: 88 (1869); Bentham: 383 (1880); Englcr: 105 (1888); Rendle: 263 (1917); Friis: 547 (1986); Friis *et al.*: 125 (1987); Friis: 5 (1989a); Friis: 80 (1991); Friis: 621 (1993).

Small trees, shrubs, woody climbers or lianas, often reaching top of supporting tree, mostly fixed to substrate by adventitious, axillary roots from stems; often with scattered stinging hairs; plants dioecious or rarely monoecious. **Leaves** alternate, entire to ± lobed, often palmately nerved, petiolate, with dot-like or sometimes also ± elongated cystoliths; stipules intrapetiolar, free or ± connate. **Inflorescences** dichotomous or irregularly branched panicles, axillary or on older nodes; bracts small or 0. **Flowers** unisexual. **Male flowers**: tepals 4 or 5, ovate, slightly imbricate; stamens 4 or 5; ovary rudimentary. **Female flowers**: tepals 4, unequal, ± free or connate; staminodes 0; ovary straight or oblique, ovoid; stigma subsessile, penicillate-capitate or rarely sublanceolate, persistent. **Achene** straight or oblique, either enclosed by the fleshy, enlarged tepals or berry-like and stipitate. **Seed** with a thin coat. $x = 8, 13$ (polyploidy).

Species 40, widespread in tropical Africa, Madagascar, tropical America and the Pacific Islands; 1 in sthn Afr.: *Urera trinervis* (Hochst.) Friis & Immelman, KwaZulu-Natal and Eastern Cape.

Urtica L. 1974000

Linnaeus: 983 (1753); Linnaeus: 423 (1754); Jussieu: 403 (1789); Endlicher: 283 (1837); Weddell: 55 (1856); Weddell: 39 (1869); Bentham: 381 (1880); Engler: 104 (1888); Rendle: 242 (1917); Brown: 542 (1925); Ball: 67 (1964); Friis: 3 (1989); Friis: 620 (1993); Chew: 70 (1989).

Annual or perennial herbs, with stinging and nonstinging hairs on same plant; stems simple or branched, erect, ascending or sprawling; plants monoecious or dioecious. **Leaves** opposite, simple, dentate or serrate, (3–)5–7-nerved, petiolate, with dot-like or ± elongate cystoliths; stipules lateral, usually free, rarely connate. **Inflorescences** axillary, in racemose or paniculate clusters; bracts narrowly triangular to lanceolate, lacking hooked hairs. **Flowers** bisexual or functionally unisexual, minute, often ebracteate. **Male flowers**: tepals 4, equal, free, with stinging hairs; stamens 4; ovary rudimentary, cup-shaped, translucent. **Female flowers**: tepals 4, unequal, inner 2 equal to achene, outer 2 smaller; staminodes 0; ovary straight, ovoid; style usually 0 or sometimes short; stigma penicillate-capitate, deciduous or persistent. **Achene** sessile, laterally compressed, ovate or oblong in outline, loosely enclosed in enlarged, membranous, rarely fleshy, persisting inner tepals. $x = 10, 11, 12, 13$ (polyploidy).

Species ± 50, subcosmopolitan but mostly in northern temperate regions, with a few in the tropics and southern temperate regions; 3 in sthn Afr., 1 indigenous, 2 introduced weeds, fairly widespread, Gauteng, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

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Vahliaceae

(Rosidae—Rosales)

Compiled by M. Jordaan

Annual or perennial herbs or subshrubs, erect, dichotomously branched, glabrous or pubescent with multicellular, often gland-tipped hairs. **Leaves** opposite, sessile to subsessile, simple, ovate to linear, entire, midrib apparent but lateral nerves obscure; stipules 0. **Inflorescences** axillary, erect, sessile to pedunculate, bearing paired, sessile to pedicellate flowers. **Flowers** bisexual, regular. **Calyx**: tube campanulate to subglobose, often distinctly 5-veined, adnate to ovary; lobes 5, valvate, persistent. **Petals** 5, free, valvate, alternating with calyx lobes, shorter than or just exceeding calyx lobes, lanceolate to round, entire to crenate or irregularly dentate, white or yellow. **Stamens** 5, alternating with petals, arising from margin of epigynous disc; filaments free, subulate, with or without a widened membranous area or scale-like appendage at base; anthers 2-thecous, dehiscing longitudinally, introrse, dorsifixed. **Ovary** inferior, 1-locular; ovules many, tenuinucellate, attached to 2 thick pendulous, flattened, rounded placentas hanging from apex of locule; styles 2 or 3, spreading, shorter than or exceeding calyx lobes, usually fused near base; stigmas capitulate. **Fruit** a capsule, subglobose or obovoid, dehiscing by 2 or 3 valves between style bases, all floral parts (except anthers) persistent. **Seeds** many, minute, oblong.

Genus 1, species 5, all in Africa, 2 extending to Madagascar, Iraq, Iran, India and Vietnam; sthn Afr.: 2 species.

The family Vahliaceae is sometimes included in the Saxifragaceae.

Dandy: 461 (1959); Bridson: 163 (1975a); Bridson: 1(1975b); Bridson:48 (1978); Bridson: 28 (1989); Thulin: 340 (1993).

Vahlia Thunb. 3201000

Thunberg: 36 (1782) name conserved; Jussieu: 318 (1789); Candolle: 53 (1830); Harvey: 306 (1862); Oliver: 383 (1871); Engler: 65 (1890); Engler: 166 (1928); Friedrich-Holzhammer: 1 (1968); Bridson: 163 (1975a); Bridson: 1 (1975b); Bridson: 48 (1978); Bridson: 28 (1989); Thulin: 340 (1993).

Bistella Adans.: 226 (1763); Delile: 97, t. 93 (1826); Bullock: 84 (1966).

Description as for family.

Species 5; 2 species with 6 intraspecific taxa in sthn Afr., widespread in drier western parts and very variable, Namibia, Botswana, Northern Province, North-West, Gauteng, Free State, NW KwaZulu-Natal, Lesotho, Northern and Western Cape.

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Valerianaceae

(Asteridae—Dipsacales)

Compiled by W.G. Welman

Annual or perennial herbs, rarely subshrubs, odoriferous. **Leaves** opposite, often radical or crowded at base of stem, with cauline ones few, small or absent; entire, toothed or up to three times pinnatisect; stipules 0. **Flowers** bisexual or unisexual by abortion, irregular, in dichotomous cymes, dense, laxly corymbose or panicled; bracts present; bracteoles usually absent. **Calyx** often small, sometimes obsolete, sometimes enlarging as flowers mature and then variously lobed and lobes sometimes feathery. **Corolla** gamopetalous; limb 5-lobed, equal, oblique or 2-lipped; lobes imbricate; tube often attenuated at base, sometimes gibbous or spurred at base, often widened at throat. **Stamens** 3, arising on corolla tube, alternating with corolla lobes, often exserted; anthers versatile, opening by longitudinal slits. **Ovary** inferior, 3-locular, but 2 locules aborting, only 1 producing a single, pendulous, anatropous, unitegmic ovule; style linear, filiform or terete; stigma divided into 3 short lobes. **Fruit** dry, resembling an achene, crowned with the sometimes enlarged calyx.

Genera ± 15, species ± 400, cosmopolitan, especially north temperate regions; sthn Afr.: genera 2, species 2.

Sonder: 39 (1865) as Valerianeae; Kokwaro: 1 (1968); Cannon: 75 (1983).

Key to genera

Calyx spathaceous, not produced into plumose bristles in fruit ..... **Valerianella**
Calyx a crenate ring, produced into plumose bristles in fruit ..... **Valeriana**

Valeriana L. 8532000
Linnaeus: 31 (1753); Cannon: 75 (1983); Burtt: 402 (1986).

Perennial herbs or subshrubs. **Leaves**: radical ones entire or toothed, cauline ones pinnatifid or pinnatisect. **Flowers** in cymes or spikes, sometimes corymbose or panicled; bracts free or sometimes connate. **Calyx** sometimes reduced to a crenate ring, becoming pappus-like or developing into 5–15 plumose-ciliate bristles in fruit. **Corolla**: tube campanulate, sometimes slightly gibbous at base; lobes ovate-elliptic, shorter than tube. **Stamens** 3, rarely 1 or 2 aborted, exserted; filaments linear, longer than the globose anthers. **Ovary** 3-locular above, 1-locular below; style terete, exserted; stigma 3-lobed. **Fruit** compressed, with one nerve on back and two on face, rarely with sterile locule equalling fertile one; crowned with pappus-like calyx. $x = 7, 8$ (6, 9, 11) (aneuploids, high polyploidy).

Species ± 200, widely distributed in northern temperate regions and in W South America; 1 in sthn Afr.: *Valeriana capensis* Thunb., widespread except Namibia, Botswana and Northern Cape.

Valerianella Mill. 8529000
Miller: [1431] (1754); Sonder: 40 (1865).

Annuals. **Leaves** opposite, entire, or upper ones often toothed or incised-pinnatifid. **Flowers** sessile, subtended by a bract, in subfastigiate or subglobose cymes. **Calyx** spathaceous, persistent or sometimes obsolete. **Corolla**: tube funnel-shaped, sometimes with a slight gibbosity at base; lobes elliptic, shorter than tube. **Stamens** 3, slightly exserted; filaments linear, longer than the globose anthers. **Ovary** 3-locular above, 1-locular below; style linear, slightly exserted; stigma minutely 3-fid. **Fruit** as for family. $x = 8$ (7, 9) (aneuploids, polyploidy).

Species ± 80, mainly temperate northern hemisphere; 1 in sthn Afr.: *Valerianella eriocarpa* Desv., Western Cape (Swellendam area), perhaps exotic, from Europe.

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Verbenaceae

(Asteridae—Lamiales)

Compiled by E. Retief

Herbs, shrubs or small trees, with branches often 4-angled, sometimes spinescent. **Leaves** mostly opposite or whorled, simple, variously lobed or deeply dissected, entire or serrate, frequently aromatic; stipules 0. **Flowers** mostly ± irregular, bisexual, often 2-lipped, in spikes, racemes or corymbs. **Calyx** 4- or 5(6–8)-lobed or -toothed, tubular or campanulate, persistent, sometimes enlarged in fruit. **Corolla** tubular, 4- or 5-lobed. **Stamens** usually 4, didynamous, arising from corolla tube and alternating with corolla lobes; anthers with 2 parallel or divergent thecae with longitudinal slits; rarely staminodes present. **Disc** usually inconspicuous. **Ovary** superior, entire or slightly to moderately 4-lobed, initially usually 2-locular but later sometimes subdivided by intrusive partitions into 4(8) locules, with a single ovule in each locule; ovules basal, erect, pendulous, or laterally attached to infolded margins of carpels or rarely to a central column, anatropous; style terminal, simple, often much exserted; stigma entire or bifid, occasionally 4-lobed. **Fruit** a drupe with 2 or 4 pyrenes or dividing at maturity into 2 or 4 nutlets or pyrenes. **Seeds** usually with a membranous testa; embryo straight; endosperm 0 or sparse.

Genera 36, ± 1 035 species in tropical and subtropical regions, with only a limited number of representatives in temperate regions; sthn Afr.: genera 8, species ± 40.

Linnaeus: 18 (1753); Linnaeus: 12 (1754); Friedrich-Holzhammer: 1 (1967); Verdcourt: 1 (1992); Zomlefer: 262 (1994).

In agreement with Cantino (1992), four genera, *Clerodendrum*, *Karomia*, *Premna* and *Vitex*, formerly regarded as belonging to the Verbenaceae, are placed in the Lamiaceae.

Key to genera

1a Flowers in branched racemes; calyx shrunk over fruit; ovary 8-locular; fruit of 4 pyrenes, each 2-locular and 2-seeded..... ***Duranta**

1b Flowers in spike-like inflorescences; ovary 2- or 4-locular and fruit various:

2a Ovary 4-locular; fruit with 2 or 4 pyrenes:

3a Calyx hardly accrescent; pyrenes 4, each 1-seeded ..... ***Verbena**

3b Calyx accrescent in fruit; pyrenes 2, each 2-seeded ..... **Priva**

2b Ovary 2-locular; fruit with (1)2 pyrenes:

4a Rachis of inflorescence thickened with a depression for each flower; fertile stamens 2 ..... ***Stachytarpheta**

4b Rachis of inflorescence terete, without depressions; fertile stamens 4:

5a Calyx with a conspicuous tube ..... **Chascanum**

5b Calyx very small and inconspicuous:

6a Fruit fleshy, drupaceous, in obvious, small clusters; calyx truncate or shallowly toothed; corolla 4- or 5-lobed.... **Lantana**

6b Fruit dry and hard; calyx 2–4-fid or conspicuously toothed; corolla 4-lobed:

7a Shrubs, subshrubs or perennial herbs, usually pyrophytes ..... **Lippia**

7b Prostrate herbs, rooting at the nodes ..... **Phyla**

Chascanum E.Mey. 7148030

Meyer: 275 (1838) name conserved; Moldenke: 113 (1938); Phillips: 637 (1951); Verdcourt: 11 (1992).

Bouchea Cham.: 252 (1832); Pearson: 197 (1901). *Plexipus* Raf.: 104 (1837). *Chascanum* E.Mey. sect. *Pterygocarpum* Walp.: 39 (1845). *Svensonia* Moldenke: 129 (1936).

Erect or spreading, perennial herbs or undershrubs, often woody at base, often densely pubescent. **Leaves** opposite or subopposite, mostly ovate or oblong, usually toothed or incised-dentate, petiolate. **Flowers** irregular, sessile or shortly pedicellate, in terminal spikes or simple, spicate racemes; rachis not excavated; bracts small and narrow; bracteoles minute or 0. **Calyx** obliquely truncate or 5-toothed; tube narrow, 5-ribbed, usually becoming ± dilated below as fruit ripens, at length splitting longitudinally in front. **Corolla** infundibuliform or hypocrateriform, white, or dull yellow; tube slender, straight or curved, often widened at apex, glabrous outside, pilose inside between stamens; limb ± oblique, with 5 subequal or unequal lobes, ± 2-lipped. **Stamens** 4, didynamous, arising in upper part of corolla tube, included; filaments longer than anthers; anthers with parallel thecae. **Ovary** 2-locular, cylindrical or narrowly oblong, glabrous; style nearly as long as corolla tube, linear with heel-shaped bend above; stigma capitate or spatulate. **Fruit** dry, straw-coloured to black, oblong, of 2 1-seeded linear-oblong nutlets ribbed on outer face, sometimes winged at apex, minutely verruculose-asperulous on seed-part inside. **Seeds** linear, without albumen.

Species 30, Africa, Madagascar, Arabian Peninsula to West India; 14 in sthn Afr., widespread.

***Duranta** L. 7162000

Linnaeus: 637 (1753); Linnaeus: 284 (1754); Pearson: 210 (1901); Phillips: 638 (1951); Moldenke & Moldenke: 277 (1983); Verdcourt: 48 (1992).

Shrubs, unarmed or spiny, or small trees. **Leaves** opposite or whorled, entire or toothed. **Flowers** irregular, few to many in terminal and axillary racemes or panicles; bracts small. **Calyx** shorter than corolla tube, truncate or 5-toothed; tube elongate-campanulate, 5-ribbed, sometimes pubescent; teeth, when present, shortly linear or minute. **Corolla** with straight or curved tube; limb 2-lipped, with 5 unequal lobes. **Stamens** 4 or 5, slightly didynamous, arising at or above middle of corolla tube, included; filaments linear, longer than anthers; anthers with distinct parallel thecae. **Ovary** globose, ± perfectly 8-locular; style usually shorter than corolla tube, linear; stigma of 4 cushion-like lobes. **Fruit** drupaceous, completely or nearly enclosed in accrescent calyx; epicarp fleshy; endocarp bony; pyrenes 4, each 2-locular and 2-seeded. **Seeds** without albumen; testa membranous. x = 6, 8, 17 (polyploidy).

Species ± 30, Caribbean to South America; **Duranta erecta* L., native in Argentina, is a cultivated, decorative shrub, occurring as an escape in Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland and KwaZulu-Natal.

Lantana L. 7144000

Linnaeus: 626 (1753); Linnaeus: 275 (1754); Pearson: 189 (1901); Phillips: 636 (1951); Moldenke & Moldenke: 212 (1983); Verdcourt: 37 (1992).

Shrubs, shrublets, rarely herbs. **Stems** erect, scandent or occasionally prostrate, usually tomentose or scabrid-hairy or sparsely to densely prickly. **Leaves** opposite or in whorls of 3(4), entire or toothed, usually rugose, mostly aromatic, usually glandular-punctate. **Flowers** mostly irregular, solitary in axils of bracts, arranged in dense, cylindric or subglobose spikes. **Calyx** small, membranous, equally 4-toothed, 4-ribbed, sometimes 2-lipped; tube cylindric or campanulate. **Corolla** yellow, purple, blue, mauve or white; sub-bilabiate, 4- or 5-lobed; tube cylindric. **Stamens** 4, didynamous, arising ± in middle of corolla tube, included; anthers ovate. **Ovary** 2-locular; style less than half as long as corolla tube, with thickend, oblique or sublateral stigma. **Axis** of fruiting spike with scars ± scattered. **Fruit** drupaceous, sometimes globose, 2-locular or separating when ripe into 2 1-seeded pyrenes. **Seeds** without albumen. x = 11 (6, 7, 8, 13, 17) (aneuploids, polyploidy).

Species 150, tropical America, tropical Africa; 4 indigenous in sthn Afr., **Lantana camara* L., a native of tropical America, is a widespread, noxious weed in sthn Afr.

Lippia L. 7145000

Linnaeus: 633 (1753); Linnaeus: 282 (1754); Pearson: 192 (1901); Phillips: 636 (1951); Verdcourt: 27 (1992).

Shrublets or shrubs. **Leaves** opposite or in whorls of 3(4), rarely alternate, entire or variously crenate, toothed or lobed, often scabrid and rugose, mostly aromatic. **Flowers** sometimes irregular, arranged in lax to dense, globose spikes which become ± cylindric as fruit ripens, each flower supported by a bract. **Calyx** campanulate or compressed, 2–4-lobed, 4-toothed or ± truncate, 2-keeled, somewhat accrescent and ultimately 2-valved, enclosing and sometimes adhering to fruit. **Corolla** white, greenish or creamy yellow; 4-lobed or sub-bilabiate; tube variable. **Stamens** 4, didynamous, arising near middle of corolla tube, included or somewhat exserted; anthers with parallel thecae, often longer than filaments. **Ovary** 2-locular; style with terminal, oblique or recurved, thickened stigma. **Axis** of fruiting spike with scars close. **Fruit** small, with dry epicarp, readily separating into 2 1-seeded pyrenes. **Seeds** without endosperm. x = 6 (8, 9) (polyploidy).

Species ± 200, tropical Africa and America; 6 indigenous in sthn Afr., widespread except in Western Cape.

Phyla Lour. 7145010

Loureiro: 66 (1790); Greene: 45 (1899); Friedrich-Holzhammer: 8 (1967); Moldenke & Moldenke: 235 (1983); Verdcourt: 25 (1992).

Creeping, perennial herbs, with slender, angular, often purplish stems rooting at nodes, with moderately dense, adpressed, medifixed, silvery white hairs. **Leaves** opposite, obovate, cuneate, entire in basal half, dentate towards apex, sparsely to densely pubescent. **Flowers** sub-bilabiate; in dense, subglobose to cylindric, pedunculate, often purplish, densely bracteate spikes. **Calyx** deeply 2-lobed, compressed, membranous; lobes acuminate, ciliate. **Corolla** white, obscurely puberulous, sub-bilabiate; tube short; upper lip erect, bifid; lower larger, obscurely 3-lobed, with middle lobe oblong. **Stamens** 4, included. **Ovary** 2-locular. **Fruit** of 2 nutlets enveloped by persistent calyx. x = 6 (polyploidy).

Species 11, in warm and tropical areas; 1 species: *Phyla nodiflora* (L.) Greene, widespread in sthn Afr.

Priva Adans. 7153000

Adanson: 505 (1763); Moldenke: 1 (1936); Phillips: 638 (1951); Verdcourt: 20 (1992).

Perennial herbs, mostly erect and harshly pubescent. **Leaves** opposite or subopposite, mostly ± toothed, sessile or petiolate. **Flowers** irregular, in terminal or axillary, simple spikes or spicate racemes, arranged in a spirally alternate or pseudosecund manner on a mostly elongate rachis; bracts small; bracteoles minute or 0.

Calyx with 5-ribbed tube, 5-toothed or almost truncate, persistent, accrescent, usually contracted and ± beaked at mouth. **Corolla** white, pink, mauve or purple; 5-lobed, ± 2-lipped, sometimes hairy within; lobes oboovate. **Stamens** 4, didynamous, arising at middle of corolla tube, sometimes a staminode present; filaments linear, longer than anthers. **Ovary** 2- or 4-locular; style ± as long as corolla tube, unequally 2-lobed. **Fruit** dry, enclosed in calyx tube, separating into two 2-locular, 2-seeded, or by abortion 1-seeded, pyrenes. **Seeds** without endosperm. $x = 6$ (polyploidy)

Species 20, tropical and subtropical Asia, Asia Minor, Africa and parts of America; 5 widespread in sthn Afr.

*Stachytarpheta Vahl 7151000

Vahl: 205 (1804); Phillips: 637 (1951); Moldenke & Moldenke: 246 (1983); Verdcourt: 17 (1992).

Annual or perennial herbs or undershrubs, glabrous to densely hairy. **Leaves** usually opposite, entire or toothed, petiolate. **Flowers** regular or slightly irregular, sessile, usually situated in depressions on thickened rachis of an elongated spike; bracts lanceolate, rigid, persistent. **Calyx** persistent, closely adpressed, not accrescent, subequally 5-toothed, 5-ribbed. **Corolla** purple, hypocrateriform, with 5 equal or unequal lobes, sometimes hairy in throat. **Stamens** 2, arising on and included in corolla tube, with 2 or 3 staminodes; filaments slightly longer than anthers; anthers with diverging thecae. **Ovary** entire, 2-locular; style ± as long as corolla tube, terete, with capitate stigma. **Fruit** dry, included in calyx, cylindric, separating into 2 1-seeded, truncate mericarps. **Seeds** linear, without albumen. $x = 8$ (polyploidy).

Species 65, in tropical and warm regions of America, tropical areas of the Old World (few); 2 species: **Stachytarpheta mutabilis* (Jacq.) Vahl and **S. urticifolia* (Salisb.) Sims are naturalised in Mpumalanga and KwaZulu-Natal.

*Verbena L. 7138000

Linnaeus: 18 (1753); Linnaeus: 12 (1754); Baker: 286 (1900); Pearson: 207 (1901); Phillips: 636 (1951); Franco: 123 (1972); Moldenke & Moldenke: 198 (1983); Verdcourt: 6 (1992).

Annual or perennial herbs or subshrubs. **Leaves** opposite, seldom whorled or alternate, toothed, often incised or partite, seldom entire. **Flowers** irregular; inflorescence a terminal, seldom axillary spike, often dense and compact to elongate, often corymbose or panicled; bracts narrow. **Calyx** tubular, 5-toothed, less than half as long as, or only slightly shorter than corolla tube; tube 5-angled, with glandular hairs; teeth ovate, subacuminate. **Corolla** blue, purplish blue or purple, salver- or funnel-shaped with a straight or curved, cylindric tube, ± pubescent within; limb variously 5-lobed, ± spreading. **Stamens** 4, didynamous, included, usually arising near middle of tube but sometimes higher. **Ovary** entire or 4-lobed, 4-locular; style slender, short; stigma unequally 2-lobed. **Fruit** dry, enclosed in calyx, separating at maturity into 4 1-seeded, linear or linear-oblong, crustaceous nutlets. $x = 5, 7$ (6) (high polyploidy).

Species 200, in tropical and temperate America, 2 or 3 species in the Old World; 6 introduced into sthn Afr. and now widespread, mainly along roadsides and in waste places.

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Violaceae

(Dilleniidae—Violales)

Compiled by C.L. Bredenkamp

Perennial, rarely annual, herbs, shrublets, shrubs or trees. **Leaves** alternate, rarely opposite, simple, margin entire, dentate or incised; stipules 2, foliaceous, small or minute, persistent or caducous. **Flowers** bisexual, irregular, sometimes regular, solitary, axillary, or in compound, often reduced, inflorescences. **Sepals** 5, usually free, persistent, quincuncial. **Petals** 5, free, deciduous or persistent, imbricate or contorted, hypogynous; in irregular flowers the anterior petal sometimes spurred or pouched. **Stamens** 5(–15), usually hypogynous; anthers connivent in a ring around the ovary, 2-thecous, introrse, opening by longitudinal slits, thecae and connective often produced into dorsal and apical appendages; filaments 0 or short, simple or variously appendaged, 2 anterior filaments often forming caudate glandular spurs. **Ovary** superior, sessile, 1-locular with 3(–5) parietal placentas bearing 1–many anatropous, bitegmic ovules; style simple, straight, oblique or sigmoid, often somewhat swollen in upper half; stigma usually entire, apical. **Fruit** a loculicidal capsule often with contractile valves. **Seeds** with a short funicle, sometimes winged, tomentose or smooth, sometimes hygroscopic, becoming glutinous when wetted, occasionally with a gibbous aril, with abundant endosperm.

Genera 23; species 830, mostly pantropical with the large cosmopolitan genus *Viola* predominantly temperate; sthn Afr.: genera 3, species ± 10.

Sonder: 72 (1860) as Violarieae; Obermeyer: 42 (1976).

Key to genera

1a Flowers regular; trees or shrubs ..... **Rinorea**
1b Flowers irregular, the anterior petal longer or shorter, often spurred; herbs or subshrubs:
2a Pedicels articulate; stipules entire, linear-acuminate; anterior petal much longer than the other 4; with or without a spur ..... **Hybanthus**
2b Pedicels inarticulate; stipules with 2 basal teeth or foliaceous, laciniate; anterior petal shorter than the other 4, spurred... ..... **Viola**

Hybanthus Jacq. 5271000

Jacquin: 2 (1760) name conserved; Robson: 164 (1958); Robson: 254 (1960); Obermeyer: 46 (1976).

Ionidium Vent.: sub t. 27 (1803); Sonder: 74 (1860).

Annuals, perennials, shrublets or shrubs. **Leaves** alternate and/or opposite, elliptic, ovate or linear, sessile or petiolate; stipules small, subulate or ovate, usually persistent, margin serrate to subentire, teeth gland-tipped. **Flowers** irregular, solitary, axillary, rarely massed in terminal inflorescences, pendulous, persistent; pedicels articulated, 2 bracteoles opposite or subopposite at or below articulation. **Sepals** free, more or less equal, not produced below. **Petals** unequal, the anterior much larger than other 4, with or without a basal pouch, clawed in the middle, expanded above into a spathulate or broad lamina; the other 4 somewhat longer than sepals. **Stamens** 5, free or connate at base, similar or 2(4) anterior ones each with a recurved, caudate, nectariferous spur projected into pouch of anterior petal; anthers connivent with connective produced above, petaloid. **Ovary** with 3 parietal placentas, 3–many ovules; style terete, short or long, straight or curved. **Capsule** with 3 elastic valves. **Seeds** broadly fusiform or ovoid-globose, apex discoid, raphe distinct or indistinct, aril usually prominent; testa striate, punctate or smooth, hygroscopic, swelling to form a glutinous covering when wetted. $x = 4$ (high polyploidy).

Species ± 100, distributed in tropical and subtropical regions, predominantly in South and Central America; 4 in sthn Afr., 2 of these endemic: *Hybanthus densifolius* Engl. confined to the Kalahari region, Namibia, Botswana, Northern Province, North-West and Northern Cape, and *H. capensis* (Thunb.) Engl. in the Northern Province and Mpumalanga and southwards along the coast to KwaZulu-Natal, and the Uitenhage District in the Eastern Cape.

Rinorea Aubl. 5262000

Aublet: 235, t. 93 (1775); Robson: 246 (1960); Obermeyer: 42 (1976).

Trees or shrubs. **Leaves** alternate, petiolate, serrate, rarely entire, with reticulate, arched, closed veins; stipules small, covering very young, pointed leaf buds, caducous. **Inflorescence** simple or compound, axillary and/or terminal; pedicels articulated; bracts small, caducous. **Flowers** regular, small. **Sepals** persistent, short and hard. **Petals** equal or subequal, soft, erect or reflexed, white, greenish white, yellow or red. **Stamens** 5; filaments connate below to form a tube, with or without appendages; anthers with connective variously appendaged and occasionally also bearing thecal appendages. **Ovary** with 3 parietal placentas; style straight; stigma terminal, small; ovules 1–several on each placenta. **Capsule** 3-valved, inner tissues woody, tearing apart from outer skin. **Seeds** 1–3 per valve, compressed, hard, shiny. $x = 6$ (high polyploidy).

Species ± 250, tropics and subtropics; 3 in sthn Afr., Northern Province, Mpumalanga, KwaZulu-Natal and Eastern Cape.

Viola L. 5274000

Linnaeus: 933 (1753); Sonder: 73 (1860); Robson: 258 (1960); Valentine : 281 (1968); Obermeyer: 50 (1976).

Herbs, rarely shrublets, erect or trailing and rooting at nodes. **Leaves** petiolate, entire or usually serrate; stipules persistent, minute to foliaceous. **Flowers** irregular, usually solitary, axillary, curved downward; pedicels long, thin, inarticulate, 2-bracteate. **Sepals** subequal, produced at base below point of insertion. **Petals** unequal, obovate, anterior one spurred or saccate. **Stamens** with very short free filaments; anthers usually coherent in a ring around ovary, 2 lower each bearing a recurved, caudate, nectariferous appendage protruded into spur of anterior petal; anther connectives produced apically into a petaloid appendage. **Ovary** unilocular with 3 parietal placentas, multi-ovulate; style variously shaped; stigma terminal. **Capsule** 3-valved. **Seeds** globose, pointed above and below, with a spongy aril. $x = 5, 6$ (7, 8, 11, 13, 17, 23, 29) (high polyploidy).

Species ± 300, cosmopolitan but mainly north temperate. **Viola odorata* L. (Violet) and **V. tricolor* L. (Pansy or Heartsease) are popular garden plants, and forms of the latter have been recorded as adventives in sthn Afr. Two closely related species occur in tropical Africa, one of these extending south to the Northern Province (Soutpansberg) and Mpumalanga (Woodbush); one species with two varieties is endemic in the Cape winter-rainfall region.

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Viscaceae

(Rosidae—Santalales)

Compiled by G. Germishuizen

Shrubby (rarely minute herbs), monoecious or dioecious, brittle, glabrous, hemiparasitic aerial parasites on dicotyledons (rarely gymnosperms); branching usually dense and intricate, forked or whorled; internodes rounded or compressed, sometimes ribbed and twisted 90°; nodes often swollen, articulated. **Leaves** opposite, simple, entire, sometimes reduced to scales; stipules 0. **Inflorescence** a typical or modified dichasium subtended by a pair of usually

fused bracts (bracteal cup). **Flowers** unisexual, minute (± 2 mm across), solitary or clustered with 3 or 4, free, valvate, often much-reduced perianth segments. **Monoecious plants** with central flower of dichasium usually male and lateral ones female, or occasionally with all flowers male or female. **Dioecious plants** with male dichasia usually bearing 3(2) flowers; female dichasia with a solitary flower in the bracteal cup. **Male flowers**: stamens opposite to and as many as perianth segments, episepalous or free; anthers dehiscing by numerous pores; pollen spherical, spined or smooth; style vestigial or lacking. **Female flowers**: ovary inferior, 1-locular; ovules undifferentiated, with 2 embryo sacs originating on a short placental column; style simple; stigma linear or capitate. **Fruit** a 1-seeded berry with a viscous layer inside the vascular bundles, white, yellow, orange, or red, smooth or warty, pedicelled or sessile in the bracteal cup; perianth segments occasionally persistent; style usually persistent. $x = 10, 11, 12$ (polyploidy).

Genera 7, ± 450 species, widely distributed in tropical and north temperate regions; sthn Afr.: genus 1, species 17.

Wiens & Tölken: 43 (1979); Polhill & Wiens: 275 (1998).

Before the publication of Wiens & Tölken (1979) the family was generally included in the Loranthaceae.

Viscum L. 2093000

Linnaeus: 1023 (1753); Linnaeus: 448 (1754); Harvey: 578 (1862); Sprague: 393 (1910); Sprague: 121 (1915); Balle: 11 (1969); Wiens & Tölken: 43 (1979); Polhill & Wiens: 279 (1998).

Description as for family.

Species ± 100, widely distributed in the African (including Madagascan) and Asian tropics with extensions into north temperate zones of Europe and Asia; 17 in sthn Afr. (the only occurrence of the genus in south temperate regions), throughout the region.

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Vitaceae

(Rosidae—Rhamnales)

Compiled by E. Retief

Erect, prostrate or climbing herbs, often with swollen or jointed nodes, or erect or semiscandent shrubs or trees with thick succulent stems. **Tendrils** present or 0, leaf-opposed or arising from a peduncle. **Leaves** alternate, simple or palmately 3–5-foliolate, rarely pedate, subsessile or petiolate; margins entire or variously toothed; stipules present or 0. **Flowers** regular, usually bisexual, usually in cymes opposite leaves; buds cylindric and constricted ± in middle, or conical to ovoid or depressed-globose, apex often inflated. **Calyx** entire or 4–6-lobed or -toothed. **Corolla**: petals 4–6, free, or often ± united at tips and falling as bud opens, valvate, becoming deflexed after anthesis, caducous. **Disc** intrastaminal, annular or of separate glands. **Stamens** 4–6, opposite petals; filaments free, straight or bending noticeably over gynoecium; anthers 2-thecous, medifixed, with longitudinal dehiscence. **Ovary** superior, 2-locular with 2 ovules in each locule; style short; stigma subulate to capitate. **Fruit** a berry, with 1–4 seeds. **Seeds** with copious, sometimes ruminate endosperm.

Genera 14, species ± 1000, in tropical to temperate regions of both hemispheres; sthn Afr.: genera 5, species 53.

Hooker: 386 (1862); Baker: 385 (1868); Planchon: 318 (1884); Phillips: 492 (1951); Suessenguth: 179 (1953); Wild & Drummond: 439 (1963); Descoings: 67 (1968); Merxmüller & Schreiber: 1 (1969); Descoings: 3 (1972); Verdcourt: 1 (1993).

Key to genera

1a Flower bud cylindric, constricted ± in the middle, apex inflated; petals hooded; disc divided into 4 glands; leaves compound, rarely simple or pedate ..... **Cyphostemma**

1b Flower bud conical or subglobose, not constricted in the middle; disc annular:

2a Flower bud conical to ovoid; disc thick, entire or lobed; leaves simple, rarely lobed or digitately compound..... **Cissus**

2b Flower bud subglobose:

3a Inflorescence usually with tendrils; style ± conical, very short; disc entire, with furrows..... **Ampelocissus**

3b Inflorescence never with tendrils; style slender, readily visible; disc without furrows:

4a Petals 4; leaves 3-foliolate or pedate; disc undulate, thin ..... **Cayratia**

4b Petals 5 or 6, rarely 4; leaves simple or 3-foliolate..... **Rhoicissus**

Ampelocissus Planch. 4910000

Planchon: 372 (1884) name conserved; Planchon: 368 (1887); Wild & Drummond: 439 (1963); Descoings: 70 (1968); Merxmüller & Schreiber: 1 (1969); Descoings: 7 (1972); Verdcourt: 2 (1993).

Botria Lour.: 153 (1790).

Perennial herbs, climbers or lianes. **Tendrils** usually present, arising from peduncle. **Leaves** simple or digitately 3–5-foliolate, margins entire or toothed; leaflets sessile or petiolate; stipules deltate, small. **Flowers** in dense or lax cymes or paniculate; buds subglobose. **Calyx** entire or obscurely 5-lobed. **Corolla** usually dark red; petals 5, oblong. **Disc** furrowed, ± entire, clasping ovary. **Stamens** 5; filaments half to two-thirds as long as petals. **Ovary** ribbed; style conical, very short; stigma

capitate. **Fruit** subglobose, glabrous. **Seeds** usually 4, flattened, ellipsoid with a strongly marked, longitudinal keel on one side and a medium furrow or pit on the other, variously rugose. $x = 10$ (high polyploidy).

Species 100, cosmopolitan in the tropics; 1 species: *Ampelocissus africana* (Lour.) Merr. is found in the northern parts of Namibia, and *A. obtusata* (Welw. ex Baker) Planch. subsp. *kirkiana* (Planch.) Wild & R.B.Drumm. occurs in Namibia, Botswana and Northern Province.

Cayratia Juss. 4918020

Jussieu: 103 (1818) name conserved, in obs.; Wild & Drummond: 491 (1963); Descoings: 74 (1968); Descoings: 18 (1972); Verdcourt: 136 (1993).

Climbing, perennial herbs. **Tendrils** present, leaf-opposed. **Leaves** 3-foliolate or pedately 5–9-foliolate, petiolate, margins toothed; stipules present. **Flowers** unisexual or bisexual; in divaricately-branched axillary cymes; buds ovoid or depressed-globose, not constricted in middle. **Calyx** entire. **Corolla** yellowish green; petals 4, hooded at apex. **Stamens** 4; filaments short. **Disc** annular, thin, undulate. **Ovary** immersed in disc; style simple, subulate; stigma capitate. **Fruit** globose or depressed-globose, rather thinly fleshy. **Seeds** 2–4, usually with the two inner faces flat and the outer concave. $x = 10$ (12) (high polyploidy).

Species 50, in tropical areas of the Old World; 1 in sthn Afr.: *Cayratia gracilis* (Guill. & Perr.) Suess., Mpumalanga.

Cissus L. 4918000

Linnaeus: 117 (1753); Linnaeus: 53 (1754); Phillips: 493 (1951); Wild & Drummond: 448 (1963); Descoings: 78 (1968); Merxmüller & Schreiber: 2 (1969); Descoings: 82 (1972); Verdcourt: 12 (1993).

Cissus sect. *Encissus* Planch.: 471 (1887).

Erect or semiscandent shrubs or climbers. **Tendrils** leaf-opposed or 0. **Leaves** simple or sometimes deeply lobed or digitately 3–7-foliolate, margins variously toothed, rarely entire; stipules present. **Flowers** in leaf-opposed or terminal, rarely axillary cymes with flowers in umbels on ultimate branchlets; buds conical to ovoid. **Calyx** entire or 4-lobed. **Corolla** dull yellow or yellow; petals 4, hooded at apex. **Disc** ± adnate to ovary, thick, annular, entire or lobed. **Stamens** 4; filaments short. **Style** simple, subulate; stigma subcapitate. **Fruit** globose, ellipsoid or ovoid. **Seed** usually 1, oblong, ovoid or subspherical, often abruptly narrowed at one end and sometimes with a dorsal crest. $x = 12$ (10, 11, 13, 14) (high polyploidy).

Species ± 200, fairly cosmopolitan in tropical and subtropical regions; 8 in sthn Afr., except in the Northern and Western Cape.

Cyphostemma (Planch.) Alston 4918010

Harvey: 249 (1860), under *Cissus*; Alston: 53 (1931); Wild & Drummond: 459 (1966); Descoings: 106 (1968); Merxmüller & Schreiber: 3 (1969); Descoings: 28 (1972); Verdcourt: 48 (1993).

Cissus L. sect. *Cyphostemma* Planch.: 472 (1887), as *Cyphostomma*.

Erect, prostrate or climbing, perennial herbs, shrubs or trees with succulent stems usually caudiciform. **Tendrils** leaf-opposed or 0. **Leaves** digitately 3–9-foliolate, sometimes simple or palmate, sessile or petiolate, margins variously toothed; stipules present. **Flowers** in leaf-opposed or axillary, ± corymbose cymes; buds cylindric or flask-shaped and constricted ± in middle, apex rounded and often ± inflated. **Calyx** entire or 4-toothed. **Corolla** yellow, yellowish green, sometimes with maroon in upper part; petals 4, hooded at apex, becoming deflexed, soon deciduous. **Disc** of 4 fleshy, truncate or conical glands, ± free from each other, but somewhat adnate to ovary. **Stamens** 4; anthers with straight filaments. **Ovary** with 2 incompletely separated locules, each with 2 ovules; style simple, subulate; stigma minutely 2-fid, subentire or subcapitate. **Fruit** a berry, ovoid or ellipsoid, glabrous or variously hairy. **Seed** usually 1, often crested and rugose. $x = 11$ (polyploidy).

Species ± 250, cosmopolitan in tropical and subtropical regions; 34 in sthn Afr., except in Northern and Western Cape.

Rhoicissus Planch. 4917000

Planchon: 463 (1887); Phillips: 492 (1951); Wild & Drummond: 444 (1963); Retief: 231 (1993); Verdcourt: 8 (1993).

Cissus L. in part; Harvey: 249 (1860).

Shrubs, often with scandent branches, or ± woody climbers. **Tendrils** leaf-opposed, sometimes 0. **Leaves** simple or 3-foliolate, rarely digitately 5-foliolate, usually petiolate, margins entire or variously toothed; stipules usually present. **Flowers** in condensed, leaf-opposed thyrsoid cymes; peduncles occasionally cirrhose; buds subglobose. **Calyx** entire or slightly lobed. **Corolla** green, greenish yellow, yellow or cream; petals (4)5 or 6, thickened or fleshy at apex. **Disc** thick, entire, with ovary immersed in it. **Stamens** as many as petals, conspicuously bending over gynoecium. **Ovary** with 2 incompletely separated locules, each with 2 ovules; style simple; stigma capitate. **Fruit** subglobose, glabrous, often warted. **Seeds** 1 or 2(–4), smooth or rugose, usually with a conspicuous longitudinal dorsal furrow and with or without basal projection. $x = 10$ (polyploidy).

Species 10, in Africa; 7 in the eastern parts of sthn Afr., absent from Namibia, Botswana and Northern Cape.

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Zygophyllaceae

(Rosidae—Sapindales)

Compiled by E. Retief

Herbs, subshrubs or shrubs; branches often jointed at nodes. **Leaves** opposite or subopposite, rarely alternate or fascicled, often somewhat fleshy, simple, (1)2- or 3-foliolate or pinnate; leaflets sessile, opposite, usually oblique, entire; stipules persistent, leathery, hairy or spinescent. **Flowers** bisexual, regular, solitary, 2-nate or occasionally in axillary cymes; bracts on peduncle 0. **Calyx** with (4)5 sepals, free or connate at base, persistent or deciduous, imbricate. **Petals** (4)5, rarely 0, free, imbricate or contorted. **Disc** usually present. **Stamens** as many or twice as many as petals, often unequal in length; filaments free, often with appendages at base; anthers 2-thecous, opening inwards with longitudinal slits. **Ovary** on disc, superior, 4- or 5(10)-locular, furrowed, angled or winged, glabrous, bristly or villous, with 2–many pendulous ovules on axile placentas in each locule; style simple or ovary occasionally with 5 or more styles, longer than ovary to 0; stigma simple, rarely discoid. **Fruit** a capsule, sometimes fleshy, often splitting into 5 indehiscent mericarps. **Seeds** pendulous, usually with endosperm.

Genera 27, species ± 250, fairly cosmopolitan in tropical and subtropical areas, mainly in hot, arid, occasionally also saline regions; sthn Afr.: genera 8, species 55, mainly in the southern and western parts of the area. Hadidi (1977) places *Tribulus* L. in the family Tribulaceae.

Brown: 545 (1814) as Zygophylleae; Sonder: 351 (1860) as Zygophylleae; Oliver: 282 (1868) as Zygophyllcae; Phillips: 432 (1951); Launert: 125 (1963); Scholz: 251 (1964); Schreiber: 1 (1966); Hadidi: 1 (1972); Hadidi: 1 (1985).

Key to genera

1a Leaves alternate and narrowly 3-lobed ..... ***Peganum**
1b Leaves opposite, fascicled or, by abortion, alternate:
2a Leaves simple or apparently so:
3a Petals 3-fid; ovary 10-locular ..... **Augea**
3b Petals entire or 0; ovary 3–5-locular:
4a Prostrate annuals with small, subterete, succulent leaves; fruit glabrous (*Z. simplex*) ..... **Zygophyllum**
4b Erect, glaucous subshrubs with pinnate leaves often appearing simple; fruit villous ..... **Sisyndite**
2b Leaves mostly 2- or 3-foliolate or pinnate:
5a Leaves mostly 2- or 3-foliolate:
6a Petals 0; ovary with 5 styles; branches glandular, jointed ..... **Seetzenia**
6b Petals (4)5; ovary with a single style:
7a Filaments without appendage; ovary hairy ..... **Fagonia**
7b Filaments with appendages; ovary glabrous ..... **Zygophyllum**
5b Leaves pinnate:
8a Leaves fascicled at nodes; nodes with spines ..... **Neoluederitzia**
8b Leaves opposite:
9a Leaflets early deciduous; ovary creamy-villous ..... **Sisyndite**
9b Leaflets persistent; ovary with bristles ..... **Tribulus**

Augea Thunb. 3967000

Thunberg: 80 (1794); Sonder: 355 (1860); Hooker: 265 (1862); Engler: 92 (1897); Engler: 158 (1931); Phillips: 434 (1951); Schreiber: 2 (1966).

Annual herbs; glabrous, succulent. **Stems** branched or unbranched. **Leaves** opposite, simple, connate, subterete. **Flowers** a few in a fascicle at nodes of branches, shortly pedicellate. **Calyx** with an obconic tube; lobes 5, ovate-lanceolate, with an apical membranous appendage, margins membranous. **Petals** 5, linear, 3-fid, with the middle lobe shortest; greenish white. **Disc** cup-shaped, with 10 filiform processes on rim. **Stamens** 10, arising on margin of disc and alternating with processes; filaments terete, with deeply 2-partite, toothed appendages; anthers oblong, obtusely mucronate at apex. **Ovary** inserted within disc, sessile, 10-locular, with 2 or 3 ovules in each locule; style short; stigma subcapitate. **Fruit** a capsule, irregularly septicidal. **Seeds** obovate in outline, somewhat compressed, densely woolly; endosperm absent.

Monotypic: *Augea capensis* Thunb., in the southern part of Namibia and in arid areas of Northern and Western Cape.

Fagonia L. 3963000

Linnaeus: 386 (1753); Linnaeus: 182 (1754); Candolle: 704 (1824); Hooker: 267 (1862); Oliver: 286 (1868); Engler: 78 (1897); Engler: 158 (1931); Phillips: 433 (1951); Schreiber: 2 (1966); Hadidi: 2 (1972); Schreiber: 572 (1974); Hadidi: 10 (1985).

Annual, biennial or perennial herbs or subshrubs, glabrous or glandular-hairy. **Stems** much branched. **Leaves** opposite, equal in size, usually 3-foliolate with terminal leaflet larger, petiolate with a characteristic joint between petiole and blade, rarely sessile; stipules usually present, often spinescent. **Flowers** solitary, pedunculate. **Calyx** deeply 5-lobed, lobes membranous, deciduous. **Petals** 5, clawed, imbricate, caducous; usually purple or purplish pink. **Disc** inconspicuous. **Stamens** 10 in 2 whorls, inserted on disc; filaments without a basal scale. **Ovary** sessile, 5-angled, hairy, 5-locular with 2 pendulous ovules from ascending basal funicles in each locule; style simple, subulate, 5-angled; stigma simple. **Fruit** a capsule, breaking up into five 1-seeded mericarps. **Seeds** compressed; testa punctate; endosperm present. $x = 9$, 10, 11 (polyploidy).

Species ± 30, mainly in the Mediterranean, SW Asia, SW North America, northeast tropical Africa to northwest India; 2 in sthn Afr.: *Fagonia capensis* Hadidi and *F. isotricha* Murb., in southern part of Namibia and northern part of Northern Cape.

Neoluederitzia Schinz 3975000

Schinz: 190 (1894); Engler: 173 (1931); Phillips: 435 (1951); Schreiber: 3 (1966).

Shrubs. **Stems** erect to recurved; each node with a spine. **Leaves** fascicled at nodes, imparipinnate, 4- or 5-jugate; leaflets oblong to obovate. **Flowers** solitary, peduncled, arising from fascicles of leaves. **Calyx** with a shallow tube, 5-lobed; lobes longer than tube, tomentose. **Petals** 5, reflexed, cuneate, villous at base, dull yellow. **Stamens** 10; filaments with a villous appendage at base. **Disc** hyaline, urceolate, enclosing ovary. **Ovary** deeply 5-lobed, 5-locular with a single ovule in each locule, villous; style simple, stout, 5-angled; stigma simple. **Fruit** a capsule breaking into 5 mericarps. **Seeds** without endosperm.

Monotypic: *Neoluederitzia sericeocarpa* Schinz, in the southern part of Namibia.

***Peganum** L. 3958000

Linnaeus: 444 (1753); Candolle: 712 (1824); Engler: 90 (1897); Engler: 154 (1931); Webb: 205 (1968).

Takhtajan (1997) includes the genus in the Peganaceae.

Perennial herbs. **Stems** terete below, angled above, much branched. **Leaves** alternate, deeply and irregularly pinnatisect, somewhat fleshy; lobes linear-lanceolate, apices acute; stipules small, linear, acute. **Flowers** solitary, pedicellate. **Calyx** deeply divided, 4-lobed; lobes 3-toothed, leaf-like. **Petals** 4 or 5, oblong or obovate, white. **Disc** annular. **Stamens** 10–15; anthers linear. **Ovary** globose, 3-lobed; style simple. **Fruit** a 3-lobed capsule, globose, stipitate. **Seeds** with endosperm. $x = 12$ (11) (polyploidy).

Species ± 6, mainly in the Mediterranean area; 1 in sthn Afr.: **Peganum harmala* L., an introduced perennial herb, has become a weed in parts of the Little Karoo near Oudtshoorn (SE Western Cape) and in the vicinity of Kenhardt (Northern Cape).

Seetzenia R.Br. ex Decne. 3964000

Decaisne: 280 (1835); Sonder: 365 (1860); Hooker: 266 (1862); Oliver: 287 (1868); Engler: 79 (1897); Engler: 160 (1931); Phillips: 433 (1951); Hadidi: 21 (1972).

Subshrubs. **Stems** conspicuously sympodially branched; branches jointed, glandular, with woolly nodes. **Leaves** opposite, petiolate, 3-foliolate; leaflets flat, apiculate, with terminal one largest, obovate; stipules intrapetiolar. **Flowers** solitary, pedicellate. **Calyx** of 5, somewhat fleshy, valvate sepals, with a horseshoe-shaped ridge on inner face and with deflexed, glandular hairs from upper portion of ridge. **Petals** 0. **Disc** inconspicuous. **Stamens** 5(7 or 8) inserted on disc; filaments thick, somewhat angled, glabrous; anthers oblong, with slightly separated thecae. **Ovary** sessile, oblong-clavate, 5-angled, 5-locular, with a single, pendulous ovule in each locule; styles 5(6 or 7), free, spreading; stigmas capitate. **Fruit** a capsule, breaking into 5 mericarps from a 5-angled axis. **Seeds** compressed; endosperm not known.

Species 2, one in N Africa and India, the other in sthn Afr.: *Seetzenia lanata* (Willd.) Bullock, in the Clanwilliam (Western Cape), Calvinia and Vanrhynsdorp areas (Northern Cape).

Sisyndite E.Mey. ex Sond. 3976000

Sonder: 354 (1860); Hooker: 265 (1862); Engler: 88 (1931); Phillips: 435 (1951); Killick: t. 1537 (1968); Schreiber: 4 (1966).

Subshrubs, glaucous. **Stems** much branched with branches terete. **Leaves** opposite or alternate, pinnate; rachis tapering, simulating branches; leaflets subopposite, petiolate, small, few, obovate, entire, often soon deciduous. **Flowers** usually solitary in forks of branches. **Calyx** somewhat leathery; sepals 5, free, unequal, variously white-woolly in upper part of ventral surface, margins membranous. **Petals** 5, sessile, obovate, yellow. **Hypogynous scales** coronate, with 5 toothed lobes, yellowish orange. **Stamens** 10; filaments tapering; anthers linear, versatile, almost as long as filaments. **Ovary** sessile, 5-angled, 5-locular, villous with long cream-coloured hairs; with a solitary, pendulous ovule in each locule; style simple, stout, terete; stigma simple. **Fruit** a capsule, somewhat crustaceous, 5-lobed, transversely furrowed, with cream-coloured hairs, splitting into 5 obliquely ovate mericarps. **Seeds** compressed; endosperm absent. $x = 10$ (1 report).

Monotypic: *Sisyndite spartea* E.Mey. ex Sond., in the southern part of Namibia, and in Northern Cape and the northwestern parts of Western Cape.

Tribulus L. 3978000

Linnaeus: 386 (1753); Linnaeus: 183 (1754); Candolle: 703 (1824); Sonder: 352 (1860); Hooker: 264 (1862); Oliver: 283 (1868); Engler: 174 (1931); Schweickerdt: 159 (1937); Phillips: 435 (1951); Launert: 126 (1963); Hadidi: 2 (1985).

Annual or perennial herbs, rarely subshrubs, pubescent, rarely glabrous. **Branches** usually prostrate, sometimes decumbent or erect. **Leaves** opposite, members of a pair usually unequal in size, paripinnate; leaflets in 5–10 pairs, one of each pair usually longer than the other, sessile, oblong to ovate, somewhat oblique, entire; stipules 2, lanceolate to ovate, membranous. **Flowers** axillary, solitary, subtended by the smaller leaf. **Calyx** of 5 deciduous or semipersistent sepals; sepals ovate to narrowly lanceolate, hairy outside. **Petals** 5, narrowly lanceolate to broadly ovate, usually yellow. **Stamens** 5 or 10, in 1 or 2 whorls; intrastaminal glands 10, free or connate to form a shallow cup at base of ovary; anthers cordate or oblong-cordate. **Ovary** sessile, 5-lobed, 5-locular with 3–5 ovules in each locule, covered with bristle-like hairs; style short or 0; stigma conspicuous, 5-angled, pyramidal or hemispheric, formed by ingrowth of the 5 stigmatic lobes. **Fruit** a capsule, 5-angled, splitting at length into 5 indehiscent mericarps; mericarps dorsally tuberculate, winged or spinous, 1–5-seeded. **Seeds** without endosperm. $x = 6$ (high polyploidy).

Species ± 25, fairly cosmopolitan in warm, somewhat arid areas; 4 in sthn Afr., widespread.

Zygophyllum L. 3965000

Linnaeus: 385 (1753); Linnaeus: 182 (1754); Candolle: 705 (1824); Sonder: 355 (1860); Hooker: 266 (1862); Oliver: 285 (1868); Engler: 80 (1897); Engler: 160 (1931); Van Huyssteen: 1 (1937); Phillips: 434 (1951); Launert: 125 (1963); Hadidi: 22 (1972); Hadidi: 8 (1985).

Subshrubs, rarely shrubs; often spiny. **Branches** sometimes jointed. **Leaves** opposite, (1)2-foliolate, usually fleshy, sometimes early deciduous; leaflets variable in shape, sometimes quite small; stipules membranous, herbaceous or spiny. **Flowers** solitary or 2 together. **Calyx** with 4 or 5 sepals, often somewhat fleshy, sometimes connate at base, occasionally outer 2 gibbous at base, persistent or deciduous, imbricate. **Petals** 4 or 5, usually sessile, sometimes clawed, imbricate, white, yellow or orange. **Disc** 8–10-angled, somewhat fleshy. **Stamens** 8–10, inserted at base of disc; filaments terete, with an entire, bifid or 2-partite appendage. **Ovary** sessile on disc, often 4- or 5-angled or globose, usually 4- or 5-locular with 2–many pendulous ovules in each locule; style simple, terete, longer or shorter than ovary; stigma minute. **Fruit** a capsule, 4- or 5-locular; 4- or 5-angled or -winged. **Seeds** few to several in each locule, crustaceous; with endosperm. $x = 11$ (8, 9, 10) (polyploidy).

Species ± 120, Mediterranean region to central Asia, mostly in the drier parts of Africa and Australia; 44 in sthn Afr., mainly in dry, brackish areas of the southern part of Namibia, and in Botswana, Free State, Northern and Western Cape.

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MONOCOTYLEDONS

*Acoraceae

(Arecidae—Arales)

Compiled by Y. Singh

Rhizomatous, aromatic wetland herbs containing ethereal oils; raphides and lactifers 0. **Leaves** distichous, linear to ensiform, equitant; venation parallel. **Inflorescence** a short, uniform, pedunculate spadix subtended by an erect, linear, leaf-like, persistent spathe. **Flowers** regular, bisexual, typically 3-merous, densely congested on spadix. **Perianth**: segments 3 + 3, free. **Stamens** 3 + 3; filaments free, linear, flattened, as long as perianth segments; anthers 2-thecous, horseshoe-shaped, dehiscing by longitudinal slit. **Ovary** superior or embedded in spadix, 2- or 3-locular; several pendulous, orthotropous ovules on apical-axile placenta; style 0; stigma subsessile. **Fruit** a ± dry berry. **Seeds** few, pendulous, with copious endosperm. $x = 12$.

Genus 1, species 2, northern hemisphere, N America to Asian tropics; introduced into southern hemisphere.

Agardh: 133 (1822); Grayum: 723 (1987); Mayo *et al.*: 289 (1997).

*Acorus L. 0694000

Linnaeus: 324 (1753); Engler: 308 (1905); Grayum: (1987); Mayo *et al.*: 289 (1997).

Description as for family.

Species 2, Old World and North American wetlands; 1 naturalised in sthn Afr.: **Acorus calamus* L., North-West and Western Cape; rhizomes contain aromatic oil which is used in perfumery; the plant is also used for the treatment of flatulence, catarrh, bronchitis and dysentery.

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Agapanthaceae

(Liliidae—Asparagales)

Compiled by N.L. Meyer & R.H. Archer

Perennial herbs, often forming colonies, glabrous, glossy, rich in saponins; with a cylindrical, branched rhizome bearing copious fleshy roots. **Leaves** evergreen or deciduous, distichous, numerous, linear, smooth, firm, acute, entire. **Flowers** bisexual, regular, arranged in a central umbel on a long, naked, stout peduncle, produced above leaves, usually very many and showy, deep to light blue or white, chartaceous, persistent; pedicels firm, erect, spreading or cernuous. **Perianth** cylindric to campanulate, forming a short or long tube, deciduous, splitting sideways; segments 3 + 3; outer 3 usually narrower than inner ones, often slightly hooded, erect or spreading. **Stamens** 3 + 3, arising from within perianth tube, loosely connivent, declinate, shorter or longer than perianth segments, somewhat unequal; anthers 2-thecous, small, versatile, dorsifixed, introrse. **Ovary** superior, ovoid or oblong, 3-locular, with many axile ovules; style filiform, semipersistent; stigma apical, small. **Capsule** ovoid to fusiform, loculicidally dehiscent. **Seeds** flat, ovate, winged, black, shiny. $x = 15$.

Monotypic: *Agapanthus* L'Hér., endemic to sthn Afr. Fay & Chase: 449 (1996) transferred *Agapanthus* from Alliaceae to Amaryllidaceae as Agapanthoideae. Here it is placed as a sister family to the Amaryllidaceae, mainly based on the superior ovary, presence of saponins and absence of amaryllid alkaloids.

Lotsy: 732 (1911); Fay & Chase: 449 (1996).

Agapanthus L'Hér. 1046000

L'Héritier: 17 (1788); Baker: 402 (1897); Leighton: 1 (1965).

Description as for family.

Species 10, sthn Afr., variable, widespread, except Namibia, Botswana and Northern Cape and mainly at higher altitudes. 'Onion-smelling' compounds absent; some species are grown as ornamentals.

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*Agavaceae

(Liliidae—Asparagales)

Compiled by G.F. Smith

Robust, monocarpic, usually rosulate perennials arising from short rhizome or short erect caudex. **Stem** commonly with monocotyledonous type secondary growth. **Leaves** usually crowded in basal rosette, leathery to succulent, amplexicaul, persisting for many years; each vascular bundle with well-developed fibrous cap at phloem pole. **Inflorescence** apical, tall, fast-growing, terminating in a panicle, often massive. **Flowers** bisexual, regular or somewhat irregular, tubular, pedicellate, trimerous throughout. **Perianth** petaloid, 3 + 3, often fleshy, united below to form a tube. **Stamens** 3 + 3; anthers mostly dorsifixed, introrse, versatile, opening by longitudinal slits, linear to oblong. **Ovary** inferior, trilocular, with septal nectaries; placentation axile; ovules in 2 vertical rows in each locule; style terminal; stigma 3-lobed. **Fruit** a loculicidal capsule. **Seeds** many, flattened, centrally embedded in copious, very hard endosperm. $x = 30$.

Genera 12, species ± 400, Old and New World tropics and subtropics, widely naturalised; sthn Afr.: genus 1 (**Agave*, the largest and most widespread), species 2, naturalised.

Cronquist: 1217 (1981); Dahlgren *et al.*: 157 (1985); Bogler & Simpson: 191 (1995); Hernández: 57 (1995); Ojeda Revah & Ludlow-Wiechers: 25 (1995).

*Agave L. 1219000

Linnaeus: 323 (1753); Trelease: 231 (1914); Berger: 21 (1915); Gentry: 41 (1972); Gentry: 10 (1978); Gentry: 61 (1982); Pedley & Forster: 72, 74 (1986); Couper & Cullen: 278 (1988); Smith & Mössmer: 31 (1996).

Description as for family.

Species ± 275; sthn Afr.: 2 introduced: **Agave americana* L. and **Agave sisalana* Perrine, naturalised around sites of habitation and as plantations for tequila and fibre production, mainly in the more arid, karroid regions of sthn Afr. Both species are included in catalogues of problem plants in sthn Afr. Many other species cultivated.

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Alismataceae

(Alismatidae—Alismatales)

Compiled by R.P. Glen

Annual or perennial, often monoecious, rarely dioecious (*Burnatia*), aquatic or marsh herbs, lactiferous; rhizome woody and irregular or tuberous, suckering or forming runners, bearing winterbuds; roots thin, abundant, branched. **Leaves** basal, subdistichous; petioles usually long, expanded below to form an open sheath; blade erect, entire, lanceolate, ovate, hastate or sagittate, rarely floating and/or submerged and then phyllodic, with distinct parallel veins converging to apex and lobes, connected by cross-veins; with an apical hydathode; axillary scales present. **Inflorescence** usually thyrsoid with flowers in whorls or in simple compound umbels. **Flowers** regular, bisexual and/or unisexual, bractiferous. **Sepals** 3, free, green, persistent. **Petals** 3 (rarely 0), free, delicate, fugaceous; pollination entomophilous, occasionally cleistogamous. **Stamens** 3–many, free; filaments filiform or expanded below; anthers 2-thecous, basifixed; pollen sphaeroid; staminodes present in some species. **Ovary** superior; carpels 3–many, free, if many, situated on a flat or convex receptacle, arranged spirally or in a ring, unilocular; ovule 1; style terminal or ventral; stigma apical; in unisexual male flowers sterile carpels may be present. **Fruit** 3–many achenes, buoyant. **Seeds** with a horseshoe-shaped embryo; endosperm 0.

Genera 11 or 12, species ± 100, mainly northern hemisphere, subcosmopolitan, with most taxa present in the tropics and subtropics; sthn Afr.: genera 5, species 6.

Carter: 1 (1960); Obermeyer: 96 (1966); Cook *et al.*: 99 (1974); Dahlgren *et al.*: 301 (1985); Cook: 25 (1990).

Key to genera

1a Leaves lanceolate to ovate, base a gradual continuation of the petiole or cuneate to cordate:

2a Plants monoecious or flowers bisexual:

3a Petals larger than the sepals; spike compound; achenes neatly arranged in a circle on the receptacle ..... **Alisma**

3b Petals smaller than the sepals; spike simple with 5–10 whorls; achenes few, not arranged in a circle ..... **Wiesneria**
2b Plants dioecious; petals minute or 0; spike compound; achenes irregularly crowded on receptacle ..... **Burnatia**
1b Leaves sagittate or deeply cordate:
4a Leaves deeply cordate; inflorescence in whorls of 3; flowers bisexual ..... **Caldesia**
4b Leaves sagittate; inflorescence with 4–7 whorls, lower whorls bearing female or bisexual flowers, upper whorls bearing mostly male flowers ..... **Limnophyton**

Alisma L. 0070000

Linnaeus: 342 (1753); Carter: 5 (1960); Obermeyer: 96 (1966); Cook *et al.*: 100 (1974); Cook: 25 (1990); Björkqvist: 1 (1967).

Perennial, aquatic herbs; stem reduced to a subterranean corm; roots short, fibrous, very abundant. **Leaves** erect, blade variable, linear-lanceolate to elliptic, base decurrent to cordate, apex acute to rounded. **Inflorescence** a verticillate, pyramidal, compound panicle, consisting of successive whorls of usually more than 3 branches, each whorl subtended by 3 bracts and several smaller bracteoles. **Flowers** bisexual, pedicellate. **Sepals** smaller than petals. **Petals** white to purplish pink. **Stamens** 6, in pairs opposite petals; filaments filiform. **Carpels** 10–20 free, situated in a circle on torus, compressed laterally; style ventral, short, filiform; ovule campylotropous. **Achenes** compressed laterally, dorsally ridged. $x = 7$ (6, 8, 13, 17) (polyploidy).

Species 9, indigenous in the northern hemisphere, by recent introductions almost cosmopolitan; 1 in sthn Afr.: *Alisma plantago-aquatica* L., sporadic distribution.

Burnatia Micheli 0079000

Micheli: 81 (1881); Obermeyer: 99 (1966); Cook: 27 (1990).

Perennial, aquatic, scapose, dioecious herbs; rhizome bulbous, covered with short thin roots. **Leaves** submerged or erect; petioles up to 0.4 m long; blades linear to lanceolate, base decurrent to rounded. **Inflorescence** a 3-merous compound umbel, sometimes reduced and few-flowered, overtopping leaves, with 3 basal acuminate bracts which at first envelop umbel in bud; bracts scarious, semipersistent, upper bracts reduced or 0. **Flowers** 3 in a whorl, evenly spaced, pedicelled. **Male flowers** with 3 concave sepals; petals 3, smaller than sepals; stamens 9; sterile carpels ± 12. **Female flowers** with 3 concave sepals; petals 0 or minute; staminodes 0–12; carpels many, closely arranged on a small receptacle, compressed; stigma ventral, discoid, papillose, subsessile; ovule basal. **Achenes** obovate-orbicular, laterally compressed, with 2 narrow, circular wings.

Species 1: *Burnatia enneandra* Micheli, tropical and sthn Afr., N Namibia and N KwaZulu-Natal. Juveniles submerged, adults submerged, floating or emergent; entomophilous; diaspores discoid nutlets and rhizome fragments, dispersed by water or by surface contact to animals.

Caldesia Parl. 0072010

Parlatore: 598 (1860); Carter: 7 (1960); Cook: 27 (1990).

Perennial or annual aquatic or wetland herbs. **Leaves** floating or submerged, rarely erect, leaf blade broadly elliptic to broadly ovate, apex rounded to obtuse, base truncate to deeply cordate. **Inflorescence** compound, pyramidal, consisting of whorls of 3 branches or 3 flowers. **Flowers** bisexual. **Sepals** spreading or reflexed. **Petals** white. **Stamens** 6(–11); filaments filiform or flattened; anthers oblong. **Carpels** 2–9(–20), free, crowded on a small receptacle; style ventral; ovule lateral. **Achenes** swollen, smooth, ridged or warty. $x = 11$.

Species 4, Europe, SE Asia, Australia and Africa; 1 in sthn Afr.: *Caldesia reniformis* (D.Don) Makino in the Okavango Delta area.

Limnophyton Miq. 0072000

Miquel: 242 (1856); Obermeyer: 97 (1966); Cook: 27 (1990).

Aquatics or marsh herbs. **Leaves** glabrous or pubescent; erect, leaf blades up to 25 mm long, ovate to sagittate, apex obtuse to rounded. **Inflorescence** a pyramidal panicle, with 4–7 whorls of flowers, lowest whorls sometimes branched and bearing female or bisexual flowers, upper whorls male flowers. **Sepals** boat-shaped, reflexed after anthesis. **Petals** larger than sepals, white, orbicular, clawed. **Stamens** 6; filaments bulbous below. **Carpels** many, crowded on a small globose receptacle; style ventral; ovule basal. **Achenes** asymmetrical, globose, shortly stipitate, with 2 lateral air-chambers between exocarp and endocarp. $x = 11$.

Species 4, tropical Africa, SE Asia & Australia; 1 in sthn Afr.: *Limnophyton obtusifolium* (L.) Miq., Gauteng, Mpumalanga and KwaZulu-Natal.

Wiesneria Micheli 0080000

Micheli: 82 (1881) as *Wisneria*; Bentham & Hooker: 1007 (1881) as *Wisneria*; Wright: 213 (1902) as *Wisneria*; Cook *et al.*: 111 (1974) as *Wisneria*; Cook: 30 (1990); Brummitt: 696 (1992).

Aquatic, monoecious, probably annual herbs; juveniles submerged; adults partly submerged with emergent leaves. **Leaves** radical, with submerged petioles and short to long, linear to linear-lanceolate exserted blades, geniculate at base. **Inflorescence** simple, verticillate, exserted, with 5–15 whorls. **Flowers** inconspicuous, small, whitish, upper verticils male, lower female, surrounded at base by 3 connate bracts. **Male flowers** 4–8 in each whorl, bracteolate, on short pedicels; sepals ovate; petals small or 0; stamens 3; sterile carpels 2 or 3. **Female flowers** 3 in each verticil, ebracteolate, sessile or shortly pedicelled; sepals ovate, persistent; petals 0–3, minute; staminodes 3; carpels 3–6, free; ovule basal; style short; stigma 3-lobed. **Achenes** 3, ovoid, rostrate, with lateral air chambers, faintly to distinctly ridged.

Species 3, SW India, tropical and subtropical Africa, and Madagascar; 1 in sthn Afr.: *Wiesneria schweinfurthii* Hook.f., N Botswana. Most early references spell the genus *Wisneria*; however, according to Cook (1990) and Brummitt (1992) the correct spelling of the genus is *Wiesneria*.

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Alliaceae

(Liliidae—Asparagales)

Compiled by N.L. Meyer

Perennial herbs with bulbs or bulb-like corms, membranous or fibrous scales, or rhizome. **Leaves** basally concentrated, spirally set or distichous, filiform-linear, lanceolate or rarely ovate, flat, terete, fistulose or angular, sheathing at base, parallel-veined; allylic sulphides and other compounds in some, to give onion-like smell. **Inflorescence** umbel-like, with short- or long-pedicelled flowers, pedicels not articulated, subtended by involucre of 2 or more membranous spathal bracts, free; scape terete or angular. **Flowers** bisexual, regular, hypogynous. **Perianth** 3 + 3, free or connate to form tubular perianth with erect, spreading or sometimes recurved lobes. **Stamens** 3 + 3; filaments arising at base of tepals or in tube, flat; anthers 2-thecous, elongate, epipeltate and introrse, opening longitudinally. **Ovary** superior, 3-locular; ovules 2–many, on axile placentas; style 1; stigma 3-lobed or capitate. **Fruit** a loculicidal, 3-locular capsule. **Seeds** black, few–many, sometimes small, ovoid or ellipsoidal to subglobose, more often triangular and half-ovoid, half-globose or tetrahedral.

Genera 30, species ± 720, widespread; sthn Afr.: genera 3 (1(2?) naturalised), species 22.

Liliaceae in part, Dyer: 915 (1976).

Dahlgren *et al.*: 193 (1985).

Key to genera

1a Rhizomatous herbs; seeds large (4–11 mm long); perianth with a corona ..... **Tulbaghia**

1b Bulbous herbs; seeds small (shorter than 4 mm); perianth without corona:

2a Perianth segments connate; spathes distinctly overlapping at their bases; more than 14 ovules per locule; without onion-smell..... ***Nothoscordum**

2b Perianth segments free or almost free; spathes not overlapping at their bases; 2–14 ovules per locule; with onion-smell.. ..... **Allium**

Allium L. 1049000

Linnaeus: 294 (1753); Baker: 407 (1897); De Wilde-Duyfjes: 23, 75 (1976).

Bulbous herbs; bulbs enclosed in membranous scales, with onion-smell, bearing copious fleshy roots. **Leaves** evergreen or deciduous, distichous, many, linear, smooth, firm, acute, entire, sheathing central, long, naked, stout scape. **Inflorescence** umbellate, many-flowered, sometimes with bulbils, carried above leaves, enveloped by 1 or 2 green or scarious, persistent or caducous, spathes. **Flowers** relatively small, usually very many and showy, pedicels firm, erect, spreading or cernuous. **Perianth**: lobes equal in length, 1-nerved, cylindric to campanulate, free or forming a short tube, deciduous, splitting sideways, erect or spreading, deep to light blue or white, chartaceous, persistent. **Stamens** arising from within perianth tube, loosely connivent, declinate, shorter or longer than perianth lobes, somewhat unequal; anthers small, dorsifixed. **Ovary** ovoid or oblong, with 2–14 ovules per locule; style filiform, semipersistent; stigma apical, small; nectaries in septa of ovary. **Fruit** globose. **Seeds** 1–4 per locule, flattened, irregularly angled. $x = 7, 8$.

Species ± 550, mainly northern hemisphere, including cultivated edible plants like **Allium cepa* L. (Onion) and **A. sativum* L. (Garlic); 31 in Africa, only 1 in sthn Afr.: *A. dregeanum* Kunth, Mpumalanga, Free State, Northern, Western and Eastern Cape, although there is some doubt whether it is of true sthn Afr. origin.

***Nothoscordum** Kunth 1050000

Kunth: 457 (1843); Henderson & Anderson: 68, t. 33 (1966); Ravenna: 485 (1991).

Bulbous herbs, 0.2–0.6 m high, resembling garlic but without its smell; bulbs producing many bulbils. **Leaves** linear, soft, flat, 0.1–0.3 m long. **Flowers** in umbels on long stems overtopping leaves; 2 small spathes below umbel, distinctly overlapping at base; pedicels 20–60 mm long; flowers 10–25 per umbel, opening mid-afternoon, lasting until late evening. **Perianth** united only at base; lobes white to greenish white. **Ovary** obovoid; with many ovules. **Stamens** shorter than tepals; filaments linear-lanceolate, contiguous in lower half. **Fruit** ± 7 mm long, papery. **Seeds** 3 mm long, shiny, angled. $x = 5, 8, 9$ (aneuploids).

Species 18, mainly in America; **Nothoscordum borbonicum* Kunth is an introduced troublesome weed, often spread from nurseries in gardens, parks, or along roads, often near houses. Parent bulbs produce many loosely attached bulblets from around the base which make it extremely difficult to control. It is closely related to **Allium* (Onion and Garlic), but plants are without the pungent smell of these. **Nothoscordum borbonicum* Kunth does not occur naturally in the wild, but it is thought to be a natural hybrid between **N. gracile* (Aiton) Stearn and **N. entrerianum* Ravenna in Argentina.

Tulbaghia L. 1047000

Linnaeus: 148 (1771); Baker: 403 (1897); Sölch & Roessler: 14 (1969); Vosa: 47 (1975); Burbidge: 77 (1978).

Perennial herbs, spreading, glabrous, often forming clumps and usually emitting a strong smell of garlic when damaged; rootstock a corm or rhizome, bearing many thick roots. **Leaves** 4–8, deciduous or evergreen according to climate, frequently distichous, several per shoot, basal, linear to lorate, soft, glossy, acute, bases tubular, persistent, forming a long sheathing neck. **Inflorescence** a 3–40-flowered umbel; scape solitary and erect. **Flowers** usually opening in succession, small, occasionally sweet-scented, marcescent, splitting sideways; umbel enclosed in bud by 2 acuminate, persistent (afterwards reflexed) spathes; bracts filiform; pedicels erect. **Perianth** united into a tube for ± half its length, with a swollen annular or lobed corona at mouth, or with 3 separate, ovate appendages arising at base of inner perianth lobes; lobes spreading-recurved, usually shorter than tube, mostly dull-coloured, green, brown, white or mauve, with or without a yellow or orange corona. **Stamens** biseriate, sessile; anthers dorsifixed, included and attached to tube. **Ovary** ovoid; with few to many ovules; style very short, columnar; stigma capitate; nectaries on septa. **Fruit** surrounded by marcescent perianth. **Seeds** triangular, shiny. $x = 6$.

Species ± 20, Africa; mostly sthn Afr., widespread in all countries and provinces. 'Onion-smelling' sulphur compounds sometimes present. Often grown as ornamentals.

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Amaryllidaceae

(Liliidae—Asparagales)

Compiled by D.A. Snijman

Perennial or biennial, alkaloid-rich herbs, mostly bulbous with thick fleshy scales, occasionally rhizomatous; roots contractile, with scalariform vessels. **Leaves** basal, distichous or rosulate; petioles, if present, often forming a false stem; blade simple, entire, linear to almost orbicular, sheathing at base, parallel-veined, glabrous or pubescent; mucilage-filled cells or raphides present in mesophyll; stomata anomocytic. **Inflorescence** of reduced helicoid cymes, appearing umbel-like, 1–many-flowered; scape leafless, solid or hollow, glabrous or rarely pubescent; spathe-valves 1–many, obvolute or equitant, membranous and ephemeral or fleshy, brightly coloured and persistent. **Flowers** bisexual, regular or irregular, trimerous, showy; pedicels short to long, stiff to lax. **Tepals** 6, in 2 equal or subequal series, free or partly connate into a short or long tube. **Stamens** 3 + 3, rarely more (*Gethyllis*), opposite tepals, arising from tepal base or perigone tube; filaments free or partly adnate to tepals, often connate into a short tube or large cup (false corona) at base; anthers 2-locular, basifixed or medifixed, versatile or filaments sometimes inserted into a sheath formed by connective, introrse or latrorse, opening by longitudinal slits or rarely by apical pores; pollen monosulcate with reticulate exine or bisulculate with spinulose exine. **Ovary** inferior, 3-locular; style simple, slender, rarely strumose or winged basally (*Strumaria*); ovules 1–many per locule, centrally inserted, either bitegmic or unitegmic to ategmic; nectaries septal, rarely protruding into swollen style base. **Fruit** loculicidally dehiscent or indehiscent; pericarp dry or fleshy. **Seeds** variable, either dry, flattened and phytomelanous, globose to wedge-shaped and sometimes phytomelanous, or water-rich, subglobose and nonphytomelanous; embryo often green.

Genera ± 60 and over 800 species; principally in warm temperate and tropical regions throughout the world. The family is most diverse in sthn Afr. followed by Andean South America; sthn Afr.: genera 18, species ± 280.

Herbert: 53 (1837) in part; Baker: 171 (1896) in part; Hutchinson: 128 (1934) in part; Markötter: 1 (1936); Barker: 108 (1939) in part; Traub: 76 (1957) in part; Hutchinson: 639 (1959) in part; Traub: 8 (1963); Huber: 394 (1969); Sölch & Roessler: 1 (1969); Arroyo & Cutler: 467 (1984); Schulze: 985 (1984); Dahlgren *et al.*: 199 (1985); Meerow: 169 (1995); Snijman & Linder: 362 (1996).

Key to genera

1a Scape hollow or solid; fruit dehiscent, leathery to papery; seeds dry and black:

2a Scape solid; filaments connate into a large conspicuous cup; seeds globose to angular ..... **Pancratium**

2b Scape hollow at least at base or apex, rarely solid; filaments free or shortly connate at the base; seeds flattened, often winged ..... **Cyrtanthus**

1b Scape solid; fruit dehiscent and papery or indehiscent and papery to fleshy; seeds water-rich, cream, pink, reddish or green:

3a Leaves 1–many, narrow, often spiralled; inflorescence acaulescent, 1-flowered; fruit clavate, cylindric or ellipsoid, much longer than wide, neither ribbed nor conspicuously veined:

4a Leaves few–many, glabrous or pubescent, often with conspicuous sheaths; stamens in a single series; anthers 6–many ..... **Gethyllis**

4b Leaves 1–few, glabrous, sheath not conspicuous; stamens in 2 series; anthers 6 ..... **Apodolirion**

3b Leaves 2–many, narrow to broad, rarely spiralled; inflorescence well developed above ground, (1–)many-flowered; fruit subfusiform to globose or trigonous, rarely much longer than wide and then ribbed or conspicuously veined:

5a Plants rhizomatous or bulbous; bulb tunics not producing extensible threads when torn; leaves often speckled with red; spathe valves 4 or more, often conspicuous; fruit indehiscent, fleshy or pulpy:

6a Plants with large, fleshy bulbs; leaves sword- to tongue-shaped, without a midrib, succulent and often pubescent... ..... **Haemanthus**

6b Plants rhizomatous; leaves glabrous:

7a Leaves with a petiole-like base and prominent midrib, thin-textured; scape somewhat flattened, not ancipitous; ovules 1 or 2 per locule ..... **Scadoxus**

7b Leaves lanceolate, thick-textured, without a prominent midrib; scape strongly compressed, 2-edged; ovules usually more than 2 per locule ..... **Clivia**

5b Plants bulbous; tunics producing extensible threads when torn; leaves immaculate or if speckled then fringed with bristles; spathe valves 2, becoming inconspicuous; fruit dehiscent or indehiscent, papery, membranous or rarely fleshy:
8a Leaf margins hyaline, ± fringed with short, branched cilia; pedicels usually shorter than flowers at anthesis; filaments free to base; fruit indehiscent, often beaked; seeds thinly cork-covered:
9a Leaves annual, distichous, closely abutting each other to form an erect fan; all leaf tips subacute to obtuse; fruiting head detaching from scape apex; fruit trigonous, prominently 3-ribbed ..... **Boophone**
9b Leaves perennial, suberect or prostrate; usually tips of all but youngest leaves truncate; fruiting head not detaching from scape apex; fruit irregulary-shaped, smooth or 6-ribbed:
10a Pedicels remaining unchanged in fruit; fruiting head persisting and drooping; fruit membranous or rarely fleshy, smooth:
11a Leaves evenly spreading or in a vertical distichous pattern, suberect to recurved, often sheathing to form a false stem; flowers irregular, sometimes only by deflexed style; perigone tube mostly curved, occasionally straight ..... **Crinum**
11b Leaves biflabellate, arching or spreading on the ground; flowers regular; perigone tube straight .... **Ammocharis**
10b Pedicels elongating and radiating after anthesis, dry and stout in fruit; fruiting head detaching at ground level; fruit 6-ribbed, walls papery ..... **Cybistetes**
8b Leaf margins smooth, softly pubescent or raised, reddened and fringed with long bristles or short, branched cilia; pedicels rarely shorter than flowers at anthesis; filaments ± connate at the base, if free then fused to the style base; fruit dehiscent, beakless; seeds cutinous, not corky:
12a Leaves with a prominent midrib; flowers longer than pedicels; seeds slightly angled by compression, pink to colourless, with only the embyro green ..... **Amaryllis**
12b Leaves without a midrib; flowers ± equalling to much shorter than pedicels; seeds ovoid, usually reddish, with integument and embryo green:
13a Flowers irregular (sometimes only by the deflexed style):
14a Leaves narrow, usually less than 25 mm wide, and subsucculent; pedicels slender, rarely longer than flowers; tepal margins ± undulate; capsules subglobose and membranous, without conspicuous transverse veins ..... **Nerine**
14b Leaves broad, usually more than 25 mm wide, and leathery; pedicels stout, usually much longer than flowers; tepal margins rarely crisped; capsules trigonous to subfusiform, with conspicuous transverse veins:
15a Leaves immaculate; margins smooth or fringed with short, branched cilia; pedicels obscurely 3-angled in cross section; filaments tightly clustered; capsules prominently ribbed, tardily dehiscent ..... **Brunsvigia**
15b Leaves speckled with red; margins fringed with long bristles; pedicels sharply triangular in cross section; filaments ± separate above the base; capsules not ribbed, readily dehiscent ..... **Crossyne**
13b Flowers regular:
16a Leaves 2(–4), glabrous or rarely minutely pilose; flowers persisting after anthesis; filaments connate into a short to long tube, free from style; anthers centrifixed to subcentrifixed; style slender ..... **Hessea**
16b Leaves 2–6, glabrous or hairy; flowers withering after anthesis; filaments free or if fused then filament tube trilocular; at least one filament whorl adnate to style base; anthers subcentrifixed to dorsifixed:
17a Leaves pubescent or glabrous, ovate to filiform; tepals free; outer or all filaments adnate to style base; style winged or swollen basally ..... **Strumaria**
17b Leaves glabrous, filiform; tepals connate into a distinct tube; inner filaments adnate to style base; style columnar throughout ..... **Carpolyza**

Amaryllis L. 1176000

Linnaeus: 293 (1753); Baker: 202 (1896); Dyer: t. 1200 (1955).

Coburgia Herb.: t. 2113 (1819); Phillips: 202 (1951).

Deciduous bulbous herbs. **Bulb** large, ± 100 mm in diameter; outer tunics tough, parchment-like, producing extensible fibres when torn. **Leaves** 7–9, present after flowering, distichous, but appearing rosulate, lorate, spreading, with a distinct midrib, glabrous or pubescent. **Inflorescence** a 6–12(–16)-flowered cluster, up to 250 mm in diameter; scape stout, solid, 450–800 mm long, slightly compressed, erect and persistent in fruit; spathe valves 2, large, oblong-lanceolate, membranous. **Flowers** showy, irregular, trumpet-shaped, white to deep pink often with a cream throat; pedicels spreading, shorter than perigone at anthesis, elongating in fruit. **Tepals** broadly lanceolate, recurved distally. **Stamens** arising from perigone base, declinate, connivent, unequal; filaments filiform, connate basally; anthers dorsifixed, versatile, curved; pollen bisulculate with spinulose exine. **Ovary** subglobose; ovules ± 8 per locule, unitegmic; style slender, declinate; stigma 3-lobed. **Capsule** large, ellipsoid, loculicidal, papery. **Seeds** fleshy, compressed-globose, ± 15 mm in diameter, white to pink; embryo green. $x = 11, 12$.

Species 2, endemic to the winter-rainfall region of sthn Afr., Northern Cape and Western Cape.

Ammocharis Herb. 1190000

Herbert: 17 (1821); Baker: 203 (1896); Milne-Redhead & Schweickerdt: 159 (1939); Sölch & Roessler: 2 (1969).

Palinetes Salisb.: 116 (1866) name illegitimate.

Deciduous bulbous herbs. **Bulb** 25–160 mm in diameter; outer tunics tough, leathery, producing extensible threads when torn. **Leaves** perennial, 5–8(–15), present during flowering, spreading to prostrate, distichous, usually conspicuously biflabellate, linear to lorate; margins hyaline, often fringed with short branched cilia; apex truncate in mature leaves. **Inflorescence** a 3–60-flowered cluster, 40–200 mm in diameter; scape compressed, solid, 10–35 mm long, reclining in fruit; spathe valves 2, lanceolate, becoming papery. **Flowers** regular, hypocrateriform to trumpet-shaped, pale to deep pink or white; pedicels spreading, shorter than to ± equalling the perigone. **Tepals** connate into a narrow, cylindrical tube; segments linear to oblanceolate, spreading or recurved, shorter to slightly longer than tube. **Stamens** arising in or slightly below perigone throat, spreading, equal; filaments filiform, free at base, exserted; anthers dorsifixed, versatile; pollen bisulculate with spinulose exine. **Ovary**

± cylindric, obtusely 3-angled; ovules 4–30 per locule, becoming ategmic; style straight, filiform, exserted or included in tube; stigma undivided. **Fruit** indehiscent, subglobose, membranous, bluntly beaked, opening irregularly. **Seeds** water-rich, subglobose, 7–15 mm in diameter, with a thin corky covering; endosperm greenish in outer layers; embryo green. $x = 11$.

Species 5, widespread throughout sub-Saharan Africa; 3 in sthn Afr., in all countries and provinces, particularly semi-arid summer-rainfall regions.

Apodolirion Baker 1187000

Baker: 74 (1878); Baker: 197 (1896); Burtt: 87 (1970); Hilliard & Burtt: 304 (1973); Müller-Doblies: 466 (1986).

Deciduous bulbous herbs. **Bulb** usually with a neck of old leaf bases. **Leaves** 1–few, usually following flowering, slender, glabrous, sometimes spiralled. **Inflorescence** 1-flowered; scape reduced, mostly shorter than bulb-neck; spathe lanceolate, sheathing. **Flower** regular, white, fugacious; pedicel reduced. **Tepals** connate into a long, usually very slender, cylindric tube somewhat dilated towards mouth; segments subequal, ascending, much shorter than tube. **Stamens** in 2 series, 3 arising in perigone throat and 3 below throat; filaments filiform, short, free to base; anthers linear, basifixed in inner series, dorsifixed in outer series, ± as long as filaments. **Ovary** enclosed within spathe and bulb-neck; ovules many per locule; style filiform; stigma apical, obscurely 3-lobed. **Fruit** indehiscent, clavate and succulent or ellipsoid with thin walls, rupturing irregularly. **Seeds** globose, dark or with a translucent outer layer; embryo green. $x = 6$.

Species ± 6, endemic to sthn Afr., ranging from Gauteng, Mpumalanga, Swaziland and Free State to KwaZulu-Natal, the Western and Eastern Cape.

Boophone Herb. 11680000

Herbert: 18 (1821), given as *Boophane*; Baker: 242 (1896) in part, given as *Buphane*; Sölch & Roessler: 3 (1969), as *Boophane*; Milne-Redhead & Schweickerdt: 162 (1939), for accepted spelling; Leighton: 59 (1947); Nordal: 21 (1982); Müller-Doblies: 355 (1994).

Deciduous bulbous herbs. **Bulb** large, up to 250 mm in diameter, ± exposed above ground, covered by many old parchment-like tunics, producing extensible threads when torn. **Leaves** ± 20, developing after flowering, distichous, spreading into a single erect fan, narrowly lanceolate, glabrous, often glaucous; margins hyaline, often undulate. **Inflorescence** 50–100- or more-flowered, in a compact or globose head, 80–250 mm in diameter; scape compressed, solid, 50–300 mm long, withering back after infructescence detaches; spathe valves 2, broadly elliptical, membranous. **Flowers** regular, funnel-shaped, pale to deep pink, red or cream; pedicels spreading, ± equalling the perigone at anthesis, radiating and lengthening considerably in fruit. **Tepals** connate into a short, narrow, funnel-shaped tube; segments ± spreading, often recurved towards apex, narrowly lanceolate. **Stamens** arising in perigone throat, equal, ± spreading, longer than tepals; filaments filiform, free at base; anthers dorsifixed; pollen bisulculate with spinulose exine. **Ovary** trigonous; ovules 1 or 2 per locule, becoming ategmic; style erect, filiform; stigma ± entire. **Fruit** indehiscent, trigonous, papery, tapering basally, prominently 3-ribbed, walls breaking open irregularly. **Seeds** water-rich, subglobose, 8–11 mm in diameter, with a thin corky covering; endosperm green in outer layers; embryo green. $x = 11$.

Species 2, widespread in all countries and provinces of sthn Afr., with 1 species ranging throughout sub-Saharan Africa.

Brunsvigia Heist. 1177000

Heister: 3 (1755); Baker: 204 (1896); Dyer: 63 (1950); Dyer: 44 (1951).

Deciduous bulbous herbs. **Bulb** 20–200 mm in diameter, subterranean or exposed; outer tunics parchment-like or cartilaginous, producing extensible fibres when torn. **Leaves** (2–)4–6(–20), present during or after flowering, distichous, suberect or appressed to the ground, often biflabellate, oblong to lingulate, smooth or adaxial surface macropapillate to bristly; margin usually raised, often fringed with short branched cilia. **Inflorescence** (3–)20–40(–80)-flowered, in a ± hemispherical head, 50–80 mm in diameter; scape strongly compressed, solid, 30–600 mm long, abscissing at ground level for seed dispersal; spathe valves 2, oblong-lanceolate, leathery to papery. **Flowers** irregular, rarely almost regular, widely flared to irregularly funnel-shaped, pink, red or rarely white; pedicels radiating, at least in fruit, much longer than or rarely as long as perigone. **Tepals** connate basally into a short tube; segments narrowly to broadly oblong-lanceolate, recurved, usually plane. **Stamens** arising near tepal base, ± declinate, rarely erect, ± equal; filaments filiform, clustered, shortly connate basally, sometimes with lateral appendages at base; anthers dorsifixed; pollen bisulculate with spinulose exine. **Ovary** subglobose to conical; ovules 3–10 per locule, unitegmic; style filiform, declinate or rarely erect; stigma 3-lobed. **Capsule** large, inflated, loculicidal, sometimes tardily so, fusiform or trigonous and tapering basally, 3-ribbed, with conspicuous transverse veining. **Seeds** fleshy, ovoid, 5–10 mm in diameter, reddish green; testa stomatose; integument and embryo green. $x = 11$.

Species ± 20, a widespread endemic of sthn Afr., in all countries and provinces, particularly speciose in semi-arid regions.

Carpolyza Salisb. 1166010

Salisbury: t. 63 (1807); Baker: 192 (1896); Leighton: 213 (1950); Müller-Doblies: 20 (1985); Snijman: 143 (1994).

Delicate bulbous herbs. **Bulb** 5–15 mm in diameter with a thin fibrous covering; tunics showing extensible threads when torn. **Leaves** 4–6, distichous, but appearing rosulate, present or rarely absent during flowering, filiform, glabrous. **Inflorescence** 1–5-flowered, in an open cluster; up to 65 mm in diameter; scape slender, solid, 25–210 mm long, spirally twisted basally, persisting after seed dispersal; spathe valves 2, narrowly lanceolate, membranous. **Flowers** regular, funnel-shaped, white, sometimes pinkish, with or without a green throat; pedicels ascending, filiform, usually longer than perigone. **Tepals** connate basally into a funnel-shaped tube; segments slightly spreading, longer than perigone tube. **Stamens** decurrent, shortly exserted from perigone tube, equal; inner whorl basally adnate to style for ± 1 mm; anthers subcentrifixed; pollen bisulculate with spinulose exine. **Ovary** subglobose; ovules 1–6 per locule, unitegmic; style erect, shortly exserted from perigone tube, stout basally; stigma trifid. **Capsule** subglobose, loculicidal, papery. **Seeds** fleshy, ovoid, ± 4 mm in diameter, green; testa stomatose; integument and embryo green. $x = 10$.

Monotypic, comprising the Western Cape endemic: *Carpolyza spiralis* (L'Hér.) Salisb., which occurs in seasonally moist sites.

Clivia Lindl. 1170000

Lindley: t. 1182 (1828); Baker: 228 (1896); Vorster: 70 (1994).

Imantophyllum Hook.: t. 4783 (1854).

Evergreen rhizomatous herbs. **Rhizome** short, or long and erect. **Leaves** several, distichous, firm, strap-shaped. **Inflorescence** a many-flowered, compact or lax cluster;

scape stout, fleshy, solid, shorter than leaves, compressed with 2 sharp edges, persisting in fruit; spathe valves 4 or more, imbricate, unequal, soon withering. **Flowers** regular or weakly irregular, narrowly to widely funnel-shaped, straight or slightly curved, spreading to pendulous, orange and yellow; pedicels shorter than to equalling perigone. **Tepals** connate into a short tube; segments connivent to somewhat spreading, 3 outer narrower than 3 inner. **Stamens** arising from perigone throat; filaments filiform, free at base, ± as long as perigone segments; anthers oblong, dorsifixed, versatile. **Ovary** globose; ovules bitegmic, 5 or 6 per locule; style long, slender; stigma tricuspidate. **Berry** subglobose, red with yellow flesh. **Seeds** 1–few, globose, ivory-coloured; embryo white to green. $x = 11$.

Species 4, confined to sthn Afr., in coastal and inland forests from the Northern Province, Mpumalanga, Swaziland and KwaZulu-Natal to the Eastern Cape.

Crinum L. 1189000

Linnaeus: 291 (1753); Baker: 198 (1896); Sölch & Roessler: 4 (1969); Verdoorn: 27 (1973); Nordal: 9 (1982).

Deciduous or evergreen bulbous herbs. **Bulb** 20–220 mm in diameter; sometimes splitting to form clumps; outer tunics tough, coriaceous, producing extensible threads when torn. **Leaves** perennial, 4–many, present during flowering, with or without a thickened midrib; sheathing bases often forming a false stem; margins sometimes undulate, hyaline, ± fringed with short, branched cilia; apex of mature leaves often truncate. **Inflorescence** a 1–25-flowered cluster, up to 300 mm in diameter; scape compressed, solid, fleshy, 30–700 mm or more long, reclining in fruit; spathe valves 2, narrowly to broadly lanceolate, membranous. **Flowers** showy, irregular, often weakly so by deflection of style, hypocrateriform to trumpet-shaped, pale to deep pink or white, often with deep pink keels; pedicels spreading, much shorter than perigone. **Tepals** connate into a long, narrow, cylindric tube, often curved; segments linear to broadly lanceolate, reflexed or ± spreading and recurved towards apex, equalling to shorter than tube. **Stamens** arising from perigone throat, arcuate and spreading or declinate, equal or unequal; filaments filiform, free at base; anthers dorsifixed, versatile, curved; pollen bisulculate with spinulose exine. **Ovary** ellipsoid; ovules ± 12 per locule, becoming ategmic; style declinate, filiform, exserted; stigma obscurely 3-lobed. **Fruit** indehiscent, subglobose, membranous or occasionally somewhat fleshy, sometimes beaked, opening irregularly. **Seeds** subglobose, 20–30 mm in diameter, with a thin corky covering, occasionally papillose; outer layers of endosperm green; embryo green. $x = 11$.

Species ± 65, pantropical; ± 40 species in sub-Saharan Africa, of which ± 20 occur in sthn Afr., widespread in all countries and provinces of the summer-rainfall region; only 1 species in Namaqualand (Northern Cape) and the Western Cape; common in vleis, salt pans, streams and grassland.

Crossyne Salisb. 1168010

Salisbury: 116 (1866); Müller-Doblies: 355 (1994).

Deciduous bulbous herbs. **Bulb** 100–130 mm in diameter, with brittle, cartilaginous tunics, producing extensible threads when torn; neck transversally banded. **Leaves** (3)4–6, present after flowering, prostrate, biflabellate, broadly lorate; lower surface speckled with red; margin raised, fringed with stiff bristles. **Inflorescence** 30–220-flowered, in a globose head, 100–400 mm in diameter; scape strongly compressed, solid, 50–280 mm long, abscissing at ground level for seed dispersal; spathe valves 2, oblong, membranous. **Flowers** irregular, sometimes very weakly so, inconspicuous, blackish maroon, dusky pink or pale yellow; pedicels radiating, much longer than perigone, trigonous in cross section. **Tepals** connate basally into a short tube; segments narrowly oblong-lanceolate, reflexed. **Stamens** arising in perigone throat, declinate or spreading, ± equal; filaments filiform, swollen and connate into a short tube at base; anthers dorsifixed; pollen bisulculate with spinulose exine. **Ovary** ovoid; ovules 2–4 per locule, unitegmic; style declinate, filiform; stigma minutely trifid. **Capsule** ovoid, loculicidal, with conspicuous transverse veining. **Seeds** fleshy, ovoid, ± 5 mm in diameter, reddish green; testa stomatose; integument and embryo green. $x = 11$.

Species 2, endemic to the winter-rainfall region of South Africa, in the Northern and Western Cape.

Cybistetes Milne-Redh. & Schweick. 1190010

Milne-Redhead & Schweickerdt: 191 (1939); Müller-Doblies: 359 (1994); Snijman & Williamson: 127 (1994).

Deciduous bulbous herbs. **Bulb** large, 100–150 mm in diameter, with a tough, leathery covering, producing extensible threads when torn. **Leaves** perennial, 9–14, present during or after flowering, prostrate, biflabellate, narrowly to broadly lorate, glabrous; margins hyaline, usually fringed with short branched cilia; apex truncate in mature leaves. **Inflorescence** a 13–90-flowered, spreading cluster, 150–340 mm in diameter; scape compressed, solid, up to 200 mm long, abscissing at ground level for seed dispersal; spathe valves 2, broadly lanceolate, coriaceous. **Flowers** weakly irregular, widely funnel-shaped, ivory or pale to dark pink; pedicels spreading, shorter than to ± equalling perigone at anthesis, lengthening and radiating in fruit. **Tepals** connate into a distinct subcylindric tube; segments oblanceolate, spreading and slightly recurved distally, longer than tube. **Stamens** arising below perigone throat, weakly declinate; filaments filiform, free at base, exserted; anthers dorsifixed, versatile; pollen bisulculate with spinulose exine. **Ovary** narrowly fusiform, obscurely trigonous; ovules 1–19 per locule, becoming ategmic; style declinate, filiform; stigma undivided. **Fruit** indehiscent, pyriform to subfusiform, somewhat trigonous, prominently 6-ribbed, bluntly beaked, walls papery, breaking open irregularly. **Seeds** water-rich, subglobose, 5–30 mm in diameter, with a thin corky covering; endosperm greenish in outer layers; embryo green. $x = 11$.

Species 1: *Cybistetes longifolia* (L.) Milne-Redh. & Schweick., widespread in the western winter-rainfall region of sthn Afr. in Namibia, Northern and Western Cape.

Cyrtanthus Aiton 1191000

Aiton: 414 (1789); Baker: 218 (1896); Dyer: 65 (1939); Gordon-Gray & Wright: 35 (1969); Nordal: 23 (1982); Reid & Dyer: 1 (1984).

Vallota Herb.: 29 (1821); Baker: 217 (1896). *Anoiganthus* Baker: 76 (1878); Baker: 193 (1896).

Deciduous or evergreen bulbous herbs. **Bulb** often splitting into large clusters or producing bulbils. **Leaves** few to several, erect to spreading, sometimes twisted or spiralled, slender to strap-shaped, glabrous, often with a conspicuous midrib, present during or after flowering. **Inflorescence** 1–many-flowered, often lax; scape hollow or rarely solid, glabrous; spathe-valves 2–4, soon withering. **Flowers** regular to weakly irregular, erect to pendulous, red, orange, yellow or white; pedicels shorter than or equalling perigone. **Tepals** connate into a distinct tube; tube usually longer than segments, ± dilated from base, often curved; segments equal or subequal. **Stamens** arising from throat or perigone tube; filaments in 2

series, usually free, rarely with bases expanded into a false corona; anthers dorsifixed, rarely pseudo-basifixed, versatile. **Ovary** subglobose; ovules many per locule; style ± as long or longer than filaments; stigma shortly to distinctly 3-lobed. **Capsule** ± ellipsoid, loculicidally 3-valved. **Seeds** black, flattened, wrinkled, usually somewhat winged. $x = 8$.

Species ± 50, in all countries and provinces of sthn Afr., except Botswana, with the greatest species diversity in eastern sthn Afr.; ± 2 species in sub-Saharan Africa.

Gethyllis L. 1186000

Linnaeus: 442 (1753); Baker: 193 (1896); Sölch & Roessler: 8 (1969); Burtt: 87 (1970); Müller-Doblies: 465 (1986).

Klingia Schonland: 178 (1919); Phillips: 203 (1951); Wilsenach: 60 (1966); Obermeyer: 136 (1980).

Deciduous bulbous herbs. **Bulb** sometimes dividing into clusters, often with a conspicuous basal sheath surrounding foliage leaves. **Leaves** few to several, frequently spiralled, often pubescent, mostly absent at flowering, often contemporary with fruit; hairs simple or medifixed. **Inflorescence** 1-flowered; scape reduced, included in bulb neck; spathe membranous, sheathing. **Flower** regular or weakly irregular by deflection of style, often several appearing from a cluster of bulbs, pink to white, fugacious; pedicel reduced. **Tepals** connate into a long, slender, fleshy, cylindric tube; segments shorter than tube, spreading. **Stamens** 6, 12, 18 or more, uniseriate, arising in perigone throat; filaments short, free or fused at base; sometimes bearing 2–5 anthers; anthers linear, basifixed, rolled backwards with age. **Ovary** enclosed in spathe and bulb-neck; ovules many per locule; style elongate, filiform, erect or laterally deflexed; stigma capitate. **Fruit** indehiscent, clavate to cylindric, ± succulent, yellowish to white, often spotted with red, aromatic and edible, rarely thin-walled, disintegrating irregularly. **Seeds** subglobose, firm, cream-coloured to reddish, small and many or large and few; embryo green. $x = 6$.

Species ± 32, semi-arid areas of sthn Afr.: Namibia, North-West, Free State, Northern Cape, Western Cape, and Eastern Cape; concentrated in Namaqualand (Northern Cape).

Haemanthus L. 1167000

Linnaeus: 325 (1753); Baker: 229 (1896) in part; Sölch & Roessler: 9 (1969); Bjørnstad & Friis: 190 (1972a) in part; Friis & Nordal: 63 (1976); Snijman: 1 (1984).

Leucodesmis Raf.: 19 (1838). *Perihema* Raf.: 20 (1838). *Serena* Raf.: 20 (1838). *Melicho* Salisb.: 130 (1866). *Diacles* Salisb.: 130 (1866).

Deciduous or evergreen bulbous herbs. **Bulb** 45–100 mm in diameter with thick fleshy tunics, usually conspicuously 2-ranked, sometimes splitting to form clumps. **Leaves** 1–6, mostly 2, present after or during flowering, distichous, erect to prostrate, ligulate to elliptical, often barred with red or dark green, glabrous or pubescent, thick-textured. **Inflorescence** a many-flowered, compact or spreading head; scape fleshy, slender to stout, solid, up to 370 mm long, ± compressed, glabrous or pubescent, sometimes spotted with red, reclining in fruit; spathe valves 4–13, spreading and membranous or erect, fleshy and brightly coloured. **Flowers** regular, funnel-shaped, spreading and lax or erect and dense, pink, red or white; pedicels shorter or slightly longer than perigone. **Tepals** connate into a short cylindric or campanulate tube; segments connivent or spreading, longer than perigone tube. **Stamens** erect or spreading, ± equal, arising in perigone throat; filaments filiform, free at base, mostly longer than tepal segments or occasionally half as long; anthers dorsifixed, versatile. **Ovary** subglobose; ovules bitegmic, solitary or in a collateral pair in each locule. **Style** erect, filiform, as long as stamens; stigma minutely tricuspidate. **Berry** ovoid to globose, white, orange or pink when ripe, often translucent and aromatic. **Seeds** ovoid, fleshy, 5–10 mm in diameter, wine-red to green or opalescent; embryo green. $x = 8, 9$.

Species 22, endemic to sthn Afr., in all countries and provinces except Botswana; most diverse in Namaqualand (Northern Cape) and the Western Cape.

Hessea Herb. 1166000

Herbert: 289 t. 29 (1837) name conserved, not of P.J.Bergius ex Schltdl.: 252 (1826); Bentham & Hooker: 720 (1883) in part; Baker: 189 (1896) in part; Sölch & Roessler: 11 (1969); Müller-Doblies: 37 (1985); Snijman: 44 (1994).

Periphanes Salisb.: 118 (1866); Leighton: 81 (1948). *Namaquanula* D. & U.Müll.-Doblies: 20 (1985). *Kamiesbergia* Snijman: 125 (1991). *Dewinterella* D. & U.Müll.-Doblies: 341 (1994).

Deciduous bulbous herbs. **Bulb** 10–60 mm in diameter; outer tunics thinly fibrous to thick and felt-like, rarely brittle, producing extensible threads when torn. **Leaves** 2(–4), present after flowering, distichous, filiform to lorate, glabrous or rarely minutely pilose. **Inflorescence** 4–65-flowered, in a ± hemispherical head, 25–120 mm in diameter; scape slender, solid, 20–220 mm long, abscissing at ground level in fruit; spathe valves 2, narrowly lanceolate, membranous. **Flowers** regular, usually stellate, rarely hypocrateriform or funnel-shaped, pink or rarely white to lemon-yellow, unmarked or with a dark centre; pedicels radiating, distinctly longer than perigone. **Tepals** free or proximally connate into a short or occasionally long tube, plane or crisped. **Stamens** spreading, often shortly confluent with tepals at base, rarely in 2 unequal series; filaments proximally connate into a very short or long tube, sometimes bearing inwardly curved hooks; anthers centrifixed to subcentrifixed; pollen bisulculate with spinulose exine. **Ovary** subglobose; ovules up to 4 per locule, unitegmic; style slender, erect, exserted or rarely included in perigone tube; stigma trifid. **Capsule** small, loculicidal, papery, subglobose. **Seeds** fleshy, ovoid, ± 4 mm in diameter, reddish green; testa stomatose; integument and embryo green. $x = 10$ (aneuploids).

Species 14, endemic to the sthn Afr. winter-rainfall region, Namibia, Northern and Western Cape.

Nerine Herb. 1175000

Herbert: t. 2124 (1820) name conserved; Herbert: 18 (1821); Herbert: 283 (1837); Baker: 209 (1896); Traub: 1 (1967); Sölch & Roessler: 11 (1969); Norris: 7 (1974).

Imliofia Heist.: 29 (1755) name rejected. *Laticoma* Raf.: 12 (1838). *Loxanthes* Salisb.: 117 (1866) in part.

Deciduous or evergreen bulbous herbs. **Bulb** 20–100 mm in diameter, with a parchment-like covering, producing extensible fibres when torn. **Leaves** (2–)4–6(–8), usually present at flowering, rarely after, distichous, filiform to lorate, glabrous. **Inflorescence** (1–)7–20(–75)-flowered, in a ± hemispherical head, up to 150(–240) mm across; scape slender or robust, solid, slightly or strongly compressed, 120–500(–900) mm long, glabrous or rarely minutely puberulous, abscissing at ground level after fruiting; spathe valves 2, narrowly lanceolate, membranous. **Flowers** irregular, sometimes weakly so, widely flared, pink, red, or white; pedicels spreading, equalling or rarely somewhat longer than perigone, glabrous or minutely pubescent. **Tepals** connate basally into a short tube; segments attenuate, recurved; margins undulate, rarely plane. **Stamens**

arising at tepal base, declinate or sometimes central, ± unequal; filaments filiform, clustered, shortly connate basally, often with short lateral appendages at base; anthers dorsifixed; pollen bisulculate with spinulose exine. **Ovary** subglobose; ovules up to 4 per locule, unitegmic; style declinate or sometimes central, filiform; stigma obscurely trifid or 3-lobed. **Capsule** small, subglobose, loculicidal, membranous, readily disintegrating. **Seeds** fleshy, ovoid, 3–7 mm in diameter, reddish green; testa stomatose; integument and embryo green. $x = 11$.

Species ± 23, endemic to sthn Afr., in all countries and provinces; most diverse in the eastern regions. Many horticultural hybrids have been described.

Pancratium L. 1202000

Linnaeus: 290 (1753); Sölch & Roessler: 12 (1969); Bjørnstad: 281 (1973); Nordal: 26 (1982).

Chapmanolirion Dinter: 49 (1909).

Deciduous bulbous herbs. **Bulb** 20–30 mm in diameter, globose, with a narrow neck. **Leaves** linear or strap-shaped, glabrous or finely pubescent, often twisted, present during or after flowering. **Inflorescence** 1–5-flowered; scape solid, relatively short, finely pubescent or glabrous; spathe valves 2, free or variously fused. **Flowers** regular, white, fugacious; pedicels short. **Tepals** connate into a long slender tube, cylindric below and funnel-shaped towards mouth; segments equal, spreading. **Stamens** arising in perigone throat; filaments united into a large conspicuous cup for more than a third of their length, free and incurving distally; anthers linear, dorsifixed, versatile. **Ovary** subglobose; ovules many per locule; style long, filiform; stigma capitate to obscurely 3-lobed. **Capsule** loculicidal, spherical to cylindric. **Seeds** glossy, black, sometimes with a white elaiosome, globose or angled by compression. $x = 11$.

Species ± 20; in the Mediterranean region, sthn Asia, the Canary Islands and Africa. Only 1 species: *Pancratium tenuifolium* Hochst. ex A.Rich., is represented in Namibia, Botswana and the Northern Province of South Africa.

Scadoxus Raf. 1167010

Rafinesque: 19 (1838); Bjørnstad & Friis: 187 (1972a) in part; Friis & Nordal: 64 (1976).

Gyaxis Salisb.: 131 (1866); Bjørnstad & Friis: 243 (1974). *Nerissa* Salisb.: 131 (1866); Bjørnstad & Friis: 254 (1974). *Demeusea* T.Durand & De Wild.: 78 (1900); Bjørnstad & Friis: 207 (1972b). *Choananthus* Rendle: 237 (1908).

Deciduous, predominantly rhizomatous herbs. **Rhizome** elongated or with a bulbous part above. **Leaves** several, narrowed into a petiole-like base, present during or after flowering; blade ovate to lanceolate, thin-textured, glabrous, with a distinct midrib; petioles often sheathing to form a false stem, with or without red spotting. **Inflorescence** a many-flowered, compact or spreading head; scape fleshy, stout, solid, slightly compressed, glabrous, erect or drooping in fruit; spathe valves 4 or more, large, ± erect and showy, or thin and early-withering. **Flowers** regular, salver-shaped and spreading apart or narrowly funnel-shaped, erect and dense, rarely drooping, red to orange; pedicels shorter to slightly longer than perigone. **Tepals** connate into a short to long tube; segments connivent or spreading, equalling to longer than perigone tube. **Stamens** erect or spreading, ± equal, arising in perigone throat; filaments filiform, free at base, slightly longer than tepal segments; anthers dorsifixed, versatile. **Ovary** subglobose; ovules 1–few per locule. **Style** erect, filiform, as long as stamens; stigma undivided. **Berry** ovoid to globose, red with yellow flesh. **Seeds** ovoid, ivory-coloured; embryo green. $x = 9$.

Species 9; widespread in tropical Africa; 3 in sthn Afr., in all countries and provinces except the Free State, Lesotho and Northern Cape.

Strumaria Jacq. 1171000

Jacquin: 49 (1797); Willdenow: 31 (1799); Herbert: 287 (1837); Bentham & Hooker: 728 (1883); Baker: 215 (1896); Sölch & Roessler: 13 (1969); Müller-Doblies: 22 (1985); Snijman: 82 (1994).

Pugionella Salisb.: 128 (1866). *Hymenetron* Salisb.: 128 (1866). *Stylago* Salisb.: 127 (1866). *Gemmaria* Salisb.: 127 (1866); Müller-Doblies: 29 (1985). *Bokkeveldia* D. & U.Müll.-Doblies: 27 (1985). *Tedingea* D. & U.Müll.-Doblies: 45 (1985).

Deciduous bulbous herbs. **Bulb** 10–50 mm in diameter; outer tunics parchment- to felt-like, if torn producing extensible fibres. **Leaves** 2–6, usually present after flowering, distichous, sometimes spreading laterally into a fan, filiform to lorate or elliptic, erect or appressed to the ground, glabrous or pubescent. **Inflorescence** up to 30-flowered, in a compact or hemispherical head, 15–100 mm in diameter; scape flexuose or stiff, rarely spirally twisted, solid, 30–480 mm long, glabrous to shortly pubescent, persisting or abscissing at ground level in fruit; spathe valves 2, narrowly lanceolate, membranous. **Flowers** regular, clustered and pendulous or widely spreading, varying from funnel-shaped to stellate, white to pink or rarely lemon-yellow; pedicels as long or distinctly longer than perigone, stiff or lax. **Tepals** free to base, plane or rarely crisped. **Stamens** erect to spreading, adnate to style at base only or up to the proximal third, sometimes adnate proximally to tepals, equal; filaments separate from each other or fused into a tube for up to half their length, usually thickened at base, sometimes toothed; anthers dorsifixed to subcentrifixed; pollen bisulculate with spinulose exine. **Ovary** subglobose, glabrous or rarely minutely pubescent; ovules up to 9 per locule, unitegmic; style erect, either 3-winged or swollen, ranging from conoidal to discoid or ovoid at base, slender distally; stigma trifid. **Capsule** small, subglobose, loculicidal, papery. **Seeds** fleshy, ovoid, 2–4 mm in diameter, reddish green; testa stomatose; integument and embryo green. $x = 10$ (11).

Species ± 23, endemic to sthn Afr., most diverse in the winter-rainfall region in Namibia, Northern Cape and Western Cape, with 2 species in semi-arid regions of the S Free State and Eastern Cape.

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Anthericaceae

(Liliidae—Asparagales)

Compiled by N.L. Meyer

Perennial herbs with erect, largely leafless aerial stem bearing terminal inflorescence; rhizomes not yellowish inside. **Leaves** in a basal rosette, spirally arranged or distichous; erect, flat and dorsiventral, sometimes terete or triangular, linear, sheathing at base; inconspicuously parallel-veined, rarely scleromorphic, rigid or succulent; oxalate raphides widely found. **Inflorescences** simple or compound racemes, or panicles, sometimes condensed into heads or clusters. **Flowers** bisexual, usually regular, rarely irregular (*Chlorophytum*), hypogynous. **Perianth** 3 + 3, free or basally connate into a tube, colours varying from white to blue or violet. **Stamens** 3 + 3; filaments free, glabrous; anthers dorsifixed-epipeltate, or basifixed, introrse, opening longitudinally; microsporogenesis usually successive; pollen sulcate. **Ovary** superior, 3-locular; placentas axile; ovules 2–many; style 1 with a small stigma. **Fruit** a loculicidal capsule. **Seeds** elongate, ovoid and often angled, black or white.

Genera ± 29, species ± 500, mainly Old World tropics, especially Australasia; sthn Afr.: genera 2, species ± 40.

Dahlgren *et al.*: 182 (1985); Stedje & Nordal: 513 (1994); Thulin: 42 (1995); Nordal *et al.*: 1 (1997).

Steroidal saponins mostly present, but anthraquinones (which are always present in the closely related Asphodelaceae, and displayed especially by the rhizomes which are yellowish when cut) absent. Cyanogenic compounds are known in *Chlorophytum*. *Caesia* R.Br. is sometimes placed in Hemerocallidaceae.

Key to genera

Perianth persistent, not spirally twisted when faded, white or pink; pedicels articulated ..... **Chlorophytum**
Perianth caducous, spirally twisted when faded, blue or white with a blue stripe; pedicels not articulated ..... **Caesia**

Caesia R.Br. 1002000

Brown: 277 (1810); Baker: 400 (1897); Bentham & Hooker: 793 (1883) as *Nanolirion* Benth.; Phillips: 184 (1951); Obermeyer: 122 (1973).

Rhizomatous, caespitose, grass-like, glabrous herbs, usually montane, with fibrous or woody roots. **Leaves** tufted, distichous, short or long, subulate to linear, sheathing basally. **Flowers** solitary, in a simple raceme, or in a lax, branched panicle, often with 2–4 accessory side branches at nodes; pedicels not articulated, erect, recurved in fruit, 1–4 in axil of each bract, developing successively. **Perianth** spirally twisted when faded, tardily deciduous, breaking off below; segments fused basally into a short tube, blue or white with a blue stripe. **Stamens** smooth or scabridulous, arising from base of perianth tube; anthers basifixed. **Ovary** with 2 ovules per locule, collateral, one projected upwards and the other downwards; style terete; stigma apical, minute. **Fruit** a globose, tripartite loculicidal capsule. **Seeds** bean-shaped, verrucose; strophiole discoid, white. $x = 7$.

Species 12: 9 in Australia, 1 in Madagascar; 2 in sthn Afr., Northern, Western and Eastern Cape.

Chlorophytum Ker Gawl. emend. Nordal 0990000

Ker Gawler: t. 1071 (1808); Baker: 397 (1897); Obermeyer: 690 (1962); Sölch *et al.*: 36 (1970); Marais & Reilly: 653 (1978); Nordal *et al.*: 535 (1990); Kativu & Nordal: 59 (1993) name emended; Kativu: 43 (1994); Nordal *et al.*: 4 (1997).

Anthericum L.: 310 (1753) in part; Baker: 378 (1897); Obermeyer: 670 (1962); Sölch *et al.*: 22 (1970); Marais & Reilly: 653 (1978); Retief & Herman: 91 (1997).

Rhizomatous herbs; with many, long, thin, variable roots, with scattered tuberous swellings, or hard, or swollen and spongy, or sometimes shortly tuberous; rhizome without anthraquinones (never yellow inside). **Leaves** rosulate, 1–many, linear to ovate, sometimes narrowed into a petiole, margin usually fimbriate. **Flowers** in a terminal, simple or branched raceme overtopping leaves, fascicled in axils of bracts, opening consecutively, rarely solitary, open all day; scape with multibracteate nodes; pedicels articulated, usually near middle. **Perianth** stellate or reflexed, rarely campanulate, persistent, enveloping capsule or rarely reflexed in fruit; segments subequal, oblong, white or pink, midrib darkening with age. **Stamens**: filaments glabrous or papillate; anthers basifixed, usually large. **Ovary** sessile or shortly stipitate, trigonous, with 6–30 biseriate ovules per locule; style declinate, terete; stigma apical, small. **Fruit** a trigonous capsule. **Seeds** large, nonarillate, thin, folded or flat, black. $x = 7$.

Species ± 165, Africa, Madagascar, Asia; 36 in sthn Afr., widespread in all countries and provinces.

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Aponogetonaceae

(Alismatidae—Najadales)

Compiled by R.P. Glen

Perennial, freshwater aquatics; rhizome tuberous, densely covered with thin, dead and living roots. **Leaves** all basal, in tufts at tip of tuber, submerged, aerial or with a floating blade; juvenile leaves often strap-shaped; adult leaves usually petiolate, with expanded, linear, elliptic or oblong lamina, mostly with a distinct midrib and 1 or more pairs of parallel main veins with many cross connections; stipules 0. **Inflorescence** simple or forked, exserted spikes, enveloped in bud by a usually early caducous, hood-shaped spathe. **Flowers** bisexual and protandrous, rarely female by suppression of anthers, usually irregular, hypogynous, ebracteate, arranged dorsally or around axis; pollination entomophilous. **Perianth segments** 1 or 2, rarely up to 6, or sometimes 0, petal-like or bract-like, free, persistent or deciduous (viz. in *Aponogeton stuhlmannii* and some closely related species), white, pink, red, mauve or yellow, folded

inwards in bud stage, spreading later, turning green with age if persistent. **Stamens** 3 + 3, rarely more, then in 3 or 4 circles, free; anthers small, 2-thecous, with thecae facing in opposite directions, basifixed; pollen separate, ellipsoid to globose, sulcate, foveolate. **Gynoecium** of 3–6(–9 in apomicts) free, sessile, turbinate carpels, attenuated into a style; style curving outwards and forming a stigmatic ridge on ventral suture; ovules 2–8 per carpel, basal, anatropous. **Fruit** of distinct, ± free follicles, membranous, opening on adaxial side; outer skin soon disintegrating; ripening often taking place under water. **Seeds** 1–6 per follicle, fusiform, in some species with a soft spongy outer covering. $x = 8$, 13 (aneuploids).

Monogeneric, 43 species, tropical to temperate regions of Asia, Africa, Madagascar and Australia; sthn Afr.: species 6.

Bennett: 42 (1897) under Naiadaceae; Obermeyer: 85 (1966); Dahlgren *et al.*: 297 (1985); Cook: 39 (1990).

Aponogeton L.f. 0065000

Linnaeus f.: 32 (1782); Obermeyer: 85 (1966); Van Bruggen: 241 (1968); Van Bruggen: 121 (1969); Van Bruggen: 457 (1970); Van Bruggen: 193 (1973).

Description as for family.

Species 14, Africa; 7 in sthn Afr., widespread, frequent in freshwater pools, swamps, flood plains, seasonally inundated grasslands, slow- or fast-flowing water.

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Araceae

(Arecidae—Arales)

Compiled by Y. Singh

Perennial, usually monoecious herbs, terrestrial, rarely epiphytic or aquatic, erect or climbing, often with watery or milky sap, usually with bundles of calcium oxalate raphides. **Stems** aerial, subterranean rhizomes or tubers or reduced. **Leaves** 1–many, alternate, sometimes basal, simple or pinnately to palmately compound, persistent or deciduous; some reduced to scale leaves (cataphylls); petiole with membranous sheath at base; lamina variously lobed or simple, usually entire, variable in shape and size, sometimes with perforations or maculations; venation parallel, pinnate or palmate. **Inflorescence** consisting of an unbranched fleshy axis (spadix) subtended by or enclosed within a large, often showy bract (spathe), but reduced and hidden in **Pistia*; pedunculate, appearing before or contemporary with leaves. **Spathe** tubular or convolute, of various colours, deciduous or persistent, sometimes only lower part persistent. **Spadix** uniform with bisexual flowers or plants monoecious with female flowers at base, male flowers above, sterile flowers often present at base, middle or apex, apical portion sometimes forming a sterile appendix, often with unpleasant smell. **Flowers** unisexual, regular, many, densely congested on spadix, small, sessile, bractless. **Perianth** 0 or with 4 or 6(8) free to ± connate, often fleshy, inconspicuous segments. **Stamens** (1)2–7; filaments free or connate; anthers free to connate, sessile or on slender, filiform filaments, opening by lateral or apical slits or terminal pores. **Staminodes** absent or interspersed among female flowers. **Ovary** superior or submersed in spadix, with 1–4 locules; locules with 1–many, anatropous to orthotropous ovules; placenta parietal, axile, basal or apical; style short or sometimes 0; stigma sessile, entire or lobed. **Fruit** a berry or somewhat coriaceous and splitting, 1–many-seeded, often brightly coloured. **Seeds** with or without endosperm.

Subfamilies 9, genera 105, species ± 3 300, tropical and subtropical with a few temperate species, mostly occurring in the New World tropics; sthn Afr.: genera 6, species 14. All local representatives are placed in subfamily Aroideae. The family is economically important, as several species are cultivated for their edible tubers and many are handsome ornamentals, among them the arum lily.

Brown: 32 (1897); Roessler: 162 (1967); Mayo: 1 (1985); Nicolson: 17 (1987); Mayo *et al.*: 80 (1997).

Key to genera

1a Aquatic herbs, free-floating; leaves forming a densely pilose rosette; inflorescence hidden, with a single female flower and a few male flowers ..... ***Pistia**

1b Terrestrial herbs, with subterranean tubers or rhizomes; leaves glabrous or subglabrous; inflorescence with few to many female flowers and several male flowers:

2a Leaf lamina compound:

3a Flowers with 4 fleshy perianth segments; spadix lacking naked appendix:

4a Leaf lamina 1-pinnate; filaments of stamens free ..... **Zamioculcas**

4b Leaf lamina 2- or 3-pinnate; filaments of stamens fused into a tube ..... **Gonatopus**

3b Flowers lacking perianth segments; spadix with naked appendix ..... **Amorphophallus**

2b Leaf lamina simple:

5a Spathe on elongated peduncle subequalling petioles, showy, convolute at base, persistent; flowers lacking perianth segments; anthers sessile ..... **Zantedeschia**

5b Spathe borne on short peduncle at ground level, inconspicuous, tubular at base, deciduous; flowers with perianth segments; anthers borne on slender filaments ..... **Stylochaeton**

Amorphophallus Blume ex Decne. 0723000

Decaisne: 366 (1834); Brown: 144 (1901); Engler: 61 (1911); Mayo: 28 (1985); Mayo *et al.*: 235 (1997) name conserved.

Acaulescent herbs, parts above ground deciduous; roots long, swollen. **Stem** usually a subglobose tuber. **Leaves** solitary, subtended by several basal cataphylls; petiole cylindrical, lacking apical pulvinus, usually smooth, often conspicuously spotted; lamina tripartite, all 3 segments erect in bud, each dividing subpinnately; pinnae decurrent. **Inflorescence** usually produced before leaves; peduncle usually shorter than petiole. **Spathe** convolute basally, upper portion usually expanded, reflexed at anthesis, deciduous. **Spadix** shorter or longer than spathe; basal portion pistillate, apical portion staminate, male zone contiguous with or separated from female zone by a short naked interstice; apical portion produced into a naked appendix. **Flowers** densely congested on spadix, without perianth segments. **Male flowers** with many, densely congested stamens; anthers subsessile or on broad filaments, dehiscing by apical pores or transverse slits. **Female flowers** with or without staminodes; ovary 1–4-locular, subglobose; ovule solitary, anatropous; style absent or elongated; stigma subglobose or variously lobed. **Fruit** a berry, globose, 1–3-seeded. **Seeds** ovoid, smooth; without endosperm. $x = 7$, 13.

Species ± 100, occurring throughout the Old World tropics; 1 in sthn Afr.: *Amorphophallus abyssinicus* (A.Rich.) N.E.Br., only in Namibia (Caprivi Strip), but widespread in Africa.

Gonatopus Hook.f. ex Engl. 0693000

Engler: 208 (1879); Engler: 306 (1905); Letty: 13 (1962); Bogner: 72 (1979); Mayo: 9 (1985); Mayo *et al.*: 149 (1997).

Zamioculcas in sense of Decne.: 321 (1870) in part, not of Schott. *Zamioculcas* Schott sect. *Gonatopus* (Engl.) Hook.f.: 994 (1883). *Heterolobium* Peter: 211, 221 (1930). *Microculcas* Peter: 212, 222 (1930).

Herbs with aerial parts deciduous. **Stem** a rhizome or subglobose tuber. **Leaf** solitary, erect, with several membranous cataphylls at base; petiole with or without an annular swelling in upper half; lamina decompound, pinnately to quadripinnately lobed; pinnae petiolulate or decurrent, alternate or subopposite. **Inflorescence** 1–several, appearing before leaf but often present during its early development. **Spathe** borne on erect, short to long, terete peduncles, convolute towards base forming a tube, limb expanded, reflexed at maturity, disintegrates with fruit development. **Spadix** subequal to spathe; female flowers at base, male flowers above, separated by a constricted zone bearing sterile flowers. **Flowers** with 4(6) decussate perianth segments. **Male flowers** many; filaments connate into a tube surrounding a central, cylindric to clavate pistillode; anthers dehiscing by apical pores; pollen globose. **Female flowers** lacking staminodes; pistil ± laterally compressed; ovary 2-locular; locules uniovulate; style short, thick; stigma discoid-capitate. **Fruit** a berry, ovoid-ellipsoid, 1- or 2-seeded. **Seeds** with smooth testa; endosperm 0. $x = 17$.

Species 5, endemic to tropical and southern subtropical Africa; 2 in sthn Afr., Mpumalanga and N KwaZulu-Natal.

***Pistia** L. 0791000

Linnaeus: 963 (1753); Linnaeus: 411 (1754); Brown: 33 (1897); Engler: 258 (1920); Mayo: 66 (1985); Henderson *et al.*: 92 (1987); Nicolson: 99 (1987); Mayo *et al.*: 286 (1997).

Acaulescent, free-floating, stoloniferous, freshwater herb, with many feathery fibrous roots. **Leaves** forming a rosette, obovate to obdeltoid, broadest above, densely pilose, green, with several ± parallel veins arising at base. **Inflorescence** small, hidden among leaf bases. **Spathe** convolute at base, apical part ± erect, expanded, acute-acuminate, white. **Spadix** in three parts, lower pistillate and naked portions adnate to spathe, upper staminate portion free. **Flowers** without perianth segments. **Male flowers** 2–8, each consisting of 2 stamens forming a synandrium, encircled by a cupular annulus and beneath it a laterally attached semicircular lobe; anthers opening by short oblique slits. **Female flower** solitary; ovary unilocular, oblique; ovules many, orthotropous, on a basal placenta; style obliquely erect, stigma subspherical. **Fruit** a berry, globose to ellipsoid, with a thin pericarp, many-seeded. **Seeds** subovoid, truncate at both ends, hard, verrucose; with abundant endosperm. $x = 14$.

Species 1: **Pistia stratiotes* L., cosmopolitan in warm regions, naturalised in sthn Afr.

Stylochaeton Lepr. 0764000

Leprieur: 184 (1834); Brown: 34 (1897); Engler: 29 (1920); Letty: 12 (1962); Mayo: 42 (1985); Mayo *et al.*: 151 (1997).

Stylochiton Schott: 10 (1855) orthographic variant.

Acaulescent, tufted herbs, with branched nodose rhizomes bearing many long swollen roots. **Leaves** 1–4 per shoot, deciduous; petiole sheathing at base, often mottled with purple; lamina simple, sagittate, hastate or cordate at base. **Inflorescence** appearing before or contemporary with leaves, borne on short peduncles at ground level. **Spathe** tubular with margins connate towards base, limb slightly expanded, deciduous. **Spadix** shorter than spathe; female flowers below, male flowers above, separated by an interstice bearing sterile flowers. **Flowers** with perianth segments fused, boat-shaped or cupular, truncate and swollen above. **Male flowers** many; stamens 2–7, exserted on long free filaments; anthers opening by lateral slits; ovary rudimentary. **Female flowers** either few, arranged in a basal circle or many, forming spirals; staminodes lacking; ovary 1- or 2-locular; ovules 1–several per locule on axial placentas; style long; stigma capitate to broadly discoid. **Fruit** a berry, 1–few-seeded. **Seeds** ovoid, tessellate; with copious endosperm. $x = 14$.

Species ± 15, restricted to tropical and southern subtropical Africa; 1 in sthn Afr.: *Stylochaeton natalensis* Schott, Mpumalanga and KwaZulu-Natal.

Zamioculcas Schott 0692000

Schott: 71 (1856); Engler: 304 (1905); Mayo: 15 (1985); Mayo *et al.*: 146 (1997).

Rhizomatous herb, with parts above ground deciduous; roots long, fleshy, swollen. **Stem** reduced to a stout tuber, subcylindric. **Leaves** 1–several, pinnately compound, subtended by several basal cataphylls; petiole stout, with basal part swollen and subpersistent, geniculate at apex; pinnae oblong, alternate, deciduous, giving rise to new plants by formation of bulbils at base under suitable conditions. **Inflorescence** 1 or 2, appearing with leaves, borne at leaf base near ground level. **Spathe** borne on short peduncle, convolute at base forming a short tube, limb expanded or spreading, reflexed at anthesis, persistent. **Spadix** subequal to spathe; female flowers borne on lower third, male flowers on upper two thirds, separated by a constricted zone bearing sterile flowers. **Flowers** with 4 free, decussate, clavate perianth segments. **Male flowers** with 4 stamens; filaments short, free; anthers opening by lateral slits; pollen filiform; pistil central, rudimentary, clavate. **Female flowers** with ovoid pistil, without staminodes; ovary 2-locular, subglobose; locules uniovulate; style short; stigma capitate.

Fruit a berry, globose, white, 1- or 2-seeded. **Seeds** ellipsoid, brown. $x = 17$.

Species 1: *Zamioculcas zamiifolia* (Lodd.) Engl., endemic to eastern and southeastern tropical Africa, extending into N KwaZulu-Natal.

Zantedeschia Spreng. 0748000

Sprengel: 756, 765 (1826); Letty: 8 (1962); Letty: 5 (1973); Singh *et al.*: 321 (1996); Mayo *et al.*: 232 (1997) name conserved.

Richardia Kunth: 433, 437, t. 20 (1818); Brown: 7 (1897); Brown: 167 (1901); Peter: 197 (1930). *Pseudohomalomena* A.D.Hawkes: 147 (1951).

Acaulescent herbs with rhizomatous or discoid tubers. **Leaves** simple, several per shoot, glabrous, rosulate, deciduous or evergreen; with 2 or 3 subulate cataphylls; petiole long, lacking apical pulvinus, base sometimes mottled or striped with white or purple, sometimes with trichomes; lamina variable, lanceolate, ovate or orbicular, with or without white pellucid spots. **Inflorescence** contemporary with leaves; peduncle usually as long as, or longer than leaves. **Spathe** cylindrical or funnel-shaped, convolute at base, with or without a purple-coloured blotch at base within, persistent, limb spreading, truncate to acute, white, cream, yellow, pink or red. **Spadix** shorter than spathe, sessile or sometimes ± stipitate; basal portion pistillate, apical portion staminate. **Flowers** without perianth segments. **Male flowers** with stamens free; anthers sessile, oblong, truncate at apex, dehiscing by apical pores; pollen white, emitted in fine long threads. **Female flowers** with or without staminodes; ovary 3-locular; ovules 1–8 per locule, with axile or subapical placentation; style short, terete; stigma capitate. **Fruit** a berry; few- to many-seeded, green or orange when ripe. **Seeds** subglobose or ovoid, mucilaginous, verrucose; with abundant endosperm. $x = 8$.

Species 8, occurs mainly in sthn Afr., widespread but absent in Northern Cape.

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Arecaceae (Palmae)

(Arecidae—Arecales)

Compiled by H.F. Glen

Evergreen trees or shrubs, often suckering, rarely scandent or acaulescent, dioecious, monoecious or polygamous. **Trunks** usually unbranched, rarely forked, fibrous, covered with persistent leaf bases or with bossed transverse scars. **Leaves** in juvenile stage usually simple and plicate, on mature plants in a terminal crown, compound, pinnate to palmate, with folds tearing apart with unfolding; petiole and/or rachis often armed with prickles, lobes toothed or serrate. **Spadix** simple or compound, enclosed in a spathe in bud stage; bracts and bracteoles usually present. **Flowers** many, small, usually unisexual, with males in upper and females in lower half of spadix, or bisexual. **Sepals** 3, free or fused below. **Petals** 3, free or fused below. **Male flowers**: stamens usually 6, rarely many; anthers 2-thecous, opening lengthwise, with copious pollen; rudimentary carpels sometimes present. **Female flowers**: staminodes sometimes present; carpels free or fused basally, mostly 3-locular; ovule solitary in each locule, erect or pendulous. **Fruit** a 1–3-seeded drupe or berry; pericarp smooth, rough, or scaly.

Genera ± 200, species ± 1 200, ± cosmopolitan, widespread throughout warmer regions, solitary or gregarious, usually hygrophilous; sthn Afr.: genera 5, species 6.

Wright: 28 (1897); Dyer: 215 (1952); Tomlinson: 96 (1962); Friedrich-Holzhammer: 1 (1967); Dransfield: 1 (1986); Uhl & Dransfield: 161 (1987).

Key to genera

1a Leaves fan-shaped; fruit globose, hard, more than 30 mm in diameter:

2a Leaves costapalmate (petiole extending into a short acute rachis); fruit 1-seeded, shortly stalked; inflorescence freely branched; male flowers 1 or 2 in grooves of terete spadices ..... **Hyphaene**

2b Leaves palmate (petiole truncate at apex); fruit 3-seeded, sessile; spikes simple, short; male flowers many, in grooves of stout spadices ..... ***Borassus**

1b Leaves pinnate; fruit fleshy (date-like), scaly, or hard and smooth, ± 30 mm in diameter:

3a Plants dioecious; fruit fleshy, date-like; lower leaf pinnae modified into spines ..... **Phoenix**
3b Plants monoecious; lower pinnae not modified into spines:
4a Fruit ovoid, covered with rhomboid, shiny, brown scales; inflorescence apical; plant monocarpic ..... **Raphia**
4b Fruit globose, hard, apiculate, ± 30 mm in diameter; inflorescence axillary; plants polycarpic ..... **Jubaeopsis**

*Borassus L. 0555000

Linnaeus: 1187 (1753); Dyer: 215 (1952); Wicht: 39 (1969); Dransfield: 18 (1986); Uhl & Dransfield: 222 (1987).

Caulescent, unbranched, dioecious; trunk up to ± 25 m tall with 1 or 2(3) ventricose swellings in upper half, fairly smooth. **Leaves** palmate; petiole ± as long as lamina, irregularly dentate; hastula irregular, visible from both sides; leaf bases persistent until anthesis. **Flowers** in axillary pendulous spikes. **Male flowers** forming branched, swollen spadices, spirally arranged in close-set transverse grooves with up to 10 flowers in each groove; sepals 3, free; petals 3, free; stamens 6, fused below into a tube, free and patent above; ovary 0. **Female flowers** in simple swollen spadices, few-flowered, with 1 compressed globose flower in each groove; sepals and petals concave, imbricate, short, obtuse; staminodes minute; ovary globose, 3-locular; stigma sessile, minute. **Fruit** globose, hard, ± 150 mm in diameter, sessile, surrounded basally by accrescent sepals and petals. **Seeds** 3, ovoid, with fibrous covering. $x = 18$.

Species 3–7, Africa to Sri Lanka; 1 in sthn Afr.: **Borassus aethiopum* Mart., probably introduced and now naturalised near Leydsdorp, Northern Province.

Hyphaene Gaertn. 0553000

Gaertner: 28, t. 10, f. 2 (1788); Wright: 30 (1897); Wicht: 31 (1969); Dransfield: 21 (1986); Uhl & Dransfield: 228 (1987).

Caulescent, often suckering, dioecious. **Trunk** slender, fibrous, occasionally ventricose, rarely dichotomously branched, closely ridged with transverse leaf scars. **Leaves** costapalmate; petiole ± as long as lamina, with spinous or sclerotic margins, base persistent; hastula distinct on both sides, lamina half-folded, recurved in upper half. **Flowers** in axillary, pendulous panicles subtended by tubular spathes. **Male flowers** in somewhat stout, fastigiate spadices, spirally arranged in ± 8 vertical, densely imbricate rows; flowers in 3s in a compressed, rhomboid, hairy cavity, subtended by a short, wide bract below; sepals 3, connate basally; petals 3, connate, forming a short tube, lobes ovate, concave; stamens 6, with short filaments; ovary 0. **Female flowers** in alternate or fastigiate spadices, in 4 vertical, densely imbricate rows, coarser and larger than males, placed in rhomboid cavities bulging with hairs, subtended by a short semicircular, truncate bract; sepals and petals equal or subequal, short, ovate, ribbed, coriaceous; staminodes 3, connate into a membranous ring; ovary subglobose, obscurely 3-lobed, 3-locular, with 1 ovule in each locule; stigmas 3, minute. **Fruit** sessile or on a short pedicel, globose, hard, shiny, 1-seeded. $x = 18$.

Species ± 10, Africa, Arabian Peninsula and Mascarene Islands; 2 in sthn Afr., Namibia, Botswana and lowveld areas of Northern Province, Mpumalanga and KwaZulu-Natal.

Jubaeopsis Becc. 0665010

Beccari: 171 (1913); Wicht: 35 (1969); Robertson: 169 (1977); Glassman: 122 (1987); Uhl & Dransfield: 489 (1987); Williams: t. 2023 (1991).

Caulescent, monoecious. **Stems** fibrous, suckering, ringed with faint leaf scars. **Leaves** pinnate, upper leaflets shortened abruptly, reduplicate, linear, apex obtuse, unarmed. **Inflorescence**: axillary panicles, drooping in fruit, rachis zigzagging and twisting between alternating unisexual flowers. **Male flowers** on upper flattened branches of rachis, sessile, bracteate; sepals 3, free, small, triangular, imbricate; petals 3, free, much larger than sepals, ovate, acute, concave, coriaceous; stamens 8–16, shorter than petals; filaments terete; anthers dorsifixed, bifid below and above; ovary rudimentary. **Female flowers** ovoid; sepals and petals broadly imbricate, concave; staminodes rudimentary, annular; ovary ovoid, 2- or 3-locular, with a single ovule in each locule. **Fruit** globose, with 3 pores above middle, 1-seeded by abortion. **Seed** globose, endosperm cartilaginous, oily, with a conspicuous cavity. $x = 80–100$.

Species 1: *Jubaeopsis caffra* Becc., Eastern Cape: Pondoland area.

Phoenix L. 0528000

Linnaeus: 1188 (1753); Wright: 29 (1897); Friedrich-Holzhammer: 1 (1967); Wicht: 27 (1969); Dransfield: 14 (1986); Uhl & Dransfield: 214 (1987).

Caulescent, rarely stemless, often suckering, dioecious. **Stems** slender, fibrous, bossed. **Leaves** pinnate; leaflets lanceolate or ensiform, induplicate, reduced to spines towards base; petiole margin unarmed; leaf bases persistent. **Flowers** in axillary pendulous panicles, unisexual, yellow, small, regularly spaced (not grouped). **Male flowers**: calyx cupular, 3-toothed; petals 3, oblong, valvate; stamens 6, filaments connate at base; ovary rudimentary or 0. **Female flowers**: calyx as in male; petals short, truncate; staminodes 6, connate into a membranous cup; carpels 3, free; stigma sessile. **Fruit** a berry developing from 1 carpel, oblong, 1-seeded with a fleshy pericarp. **Seed** ovoid, grooved ventrally. $x = 18$ (14).

Species ± 17, Africa to Asia; 1 in sthn Afr.: *Phoenix reclinata* Jacq., Namibia, Botswana, Northern Province, Mpumalanga, Swaziland, eastern lowveld areas in KwaZulu-Natal as far south as Bathurst District in Eastern Cape.

Raphia P.Beauv. 0559000

Palisot de Beauvois: 75 (1805); Obermeyer & Strey: 29 (1969); Wicht: 43 (1969); Otedoh: 145 (1982); Dransfield: 37 (1986); Uhl & Dransfield: 275 (1987).

Caulescent, often tall, rarely acaulescent, solitary or suckering, monoecious, monocarpic. **Leaves** pinnate, often very large; petiole unarmed; rachis with small ascending spines; leaflets reduplicate, linear, margin and midrib spinous. **Spadix** compound, axillary and pendulous or terminal and erect; peduncle covered by 2-ranked, imbricate, gaping bracts; branches and abbreviated flowering branchlets laterally compressed, laxly arranged or congested in one plane; bracts 2-ranked, imbricate. **Flowers** 2-ranked; females near base; males on upper part of spadix. **Male flowers** with a bicarinate bracteole; calyx tubular or 3-lobed; petals 3, free or nearly so; stamens 6–many, free or connate; ovary 0. **Female flowers** with an outer and an inner bracteole and an accrescent calyx and corolla; staminodial ring adnate to corolla; anthers minute or 0; ovary 3-locular, with 1 ovule developing; style short or 0, with 3 stigmas. **Fruit** ovoid, covered with brown, imbricate scales arranged in vertical rows, each with a median groove, apex rostrate; 1-seeded. $x = 14$.

Species ± 28, mainly tropical Africa and Madagascar, 1 in South America; 1 in sthn Afr.: *Raphia australis* Oberm. & Strey, KwaZulu-Natal; also in Mozambique.

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Asparagaceae

(Liliidae—Asparagales)

Compiled by N.L. Meyer

Suffrutices or scramblers with perennial or annual stems from a compact woody base. **Rhizome** sympodial, often covered by persistent erect cataphylls; roots many, fibrous or often tuberous. **Leaves** much reduced, bract-like, with a spinous or soft spur. **Cladodes** (phylloclades) solitary or fascicled, persistent or deciduous, green, terete or angled to flat, linear to ovate, apex mucronate, in some species forming a basal disc. **Spines** usually present and in some species cauline or foliar in origin. **Flowers** bisexual, regular, hypogynous, inconspicuous, solitary, fascicled or racemose; peduncles or pedicels terete or grooved or reduced to a disc or none, articulated once or twice; bracts minute or larger and concave. **Tepals** 3 + 3, similar, free and spreading or fused basally. **Stamens** 3 + 3; filaments free, arising from base of tepals; anthers bilocular, versatile, introrse, dorsifixed. **Ovary** superior, 3-locular with 2–12 axile ovules per locule; style usually short; stigma capitate, 3-lobed or with 3 branches. **Fruit** usually a globose or ovoid berry, sometimes a nutlet, tepals often persisting below. **Seeds** 1–several, globose, black. $x = 10$.

Genus 1, species ± 120; Africa, Asia, Europe; introduced in Australia; sthn Afr.: species 81.

Jussieu: 40 (1789); Dahlgren *et al.*: 141 (1985); Obermeyer & Immelman: 11 (1992).

Asparagus L. 1113000

Linnaeus: 313 (1753); Baker: 256 (1896); Jessop: 31 (1966); Merxmüller: 25 (1970); Malcomber & Sebsebe: 63 (1993); Fellingham & Meyer: 205 (1995).

Myrsiphyllum Willd.: 25 (1808); Obermeyer: 86 (1984); Obermeyer & Immelman: 71 (1992). *Protasparagus* Oberm.: 243 (1983); Obermeyer & Immelman: 11 (1992).

Description as for family.

Species 81, widespread in all countries and provinces.

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Asphodelaceae

(Liliidae—Asparagales)

Compiled by G.F. Smith & N.L. Meyer

Perennial, rarely annual, herbs, subshrubs, succulent rosette plants to small pachycaul trees; often rhizomatous; roots often yellowish inside, sometimes inflated and fusiform or with multi-layered velamen. **Leaves** generally dorsiventral, often thick and succulent, sometimes terete, usually spirally set, occasionally distichous; linear or subulate to thickly conical or elliptic, sheathing at base, and in succulent genera often serrate-dentate and apically spiny; veins longitudinal but indistinct when leaves are succulent. **Inflorescences** simple or compound racemes or spikes; on terminal peduncle, leafless or with bracteal leaves, unibracteate nodes. **Flowers** bisexual, regular to conspicuously irregular, hypogynous; pedicels without articulation (except in *Kniphofia*). **Perianth** segments 3 + 3, free or nearly free or fused into tube, white, yellow, orange, red, or mauve, never blue-violet. **Stamens** 3 + 3, arising at base of ovary; filaments free, linear, rarely provided with hairs; anthers 2-thecous, dorsifixed-epipeltate, introrse, opening longitudi-

nally; microsporogenesis simultaneous. **Ovary** superior, 3-locular; placentas axile; ovules 2–many; style 1 with small apical stigma. **Fruit** a 3-locular, loculicidal capsule. **Seeds** arillate, elongated and ovoid.

Jussieu: 51 (1789); Dahlgren *et al.*: 179 (1985); Smith & Van Wyk: 576 (1991); Smith & Van Wyk: 130 (1998).

Genera 15, species ± 780, in Europe, Africa, Asia, Australia, New Zealand; sthn Afr.: 10 genera, ± 353 species.

Anthraquinones found frequently, steroidal saponins absent. Aloaceae is sometimes retained as distinct from the Asphodelaceae (Cronquist 1981), from which it differs inconsistently by having succulent leaves, tubular flowers, a basic bimodal chromosome complement of 4 long and 3 short chromosomes and the presence of a parenchymatous cap at the phloem pole.

Classification of Asphodelaceae

I. Subfamily ALOOIDEAE (Succulent rosette plants to small pachycaul trees): *Aloe, Astroloba, Chortolirion, Gasteria, Haworthia, Poellnitzia*

II. Subfamily ASPHODELOIDEAE (Perennial, rarely annual herbs to subshrubs): *Bulbine, Bulbinella, Kniphofia, Trachyandra*

Key to genera

1a Perianth stellate to campanulate, segments free:
  2a Filaments densely bearded ..... **Bulbine**
  2b Filaments glabrous or scabrid:
    3a Leaves usually thickly leathery to somewhat succulent; flowers white, rarely yellow, pink or mauve, segments usually dark-keeled, deciduous, cohering apically when wilted ..... **Trachyandra**
    3b Leaves soft (mesophytic), somewhat succulent; flowers yellow, orange, white or cream, segments without dark keel, persistent ..... **Bulbinella**
1b Perianth tubular, usually with short, erect or erecto-patent lobes, segments at least partly fused towards the base:
  4a Leaves distinctly V-shaped in cross section (except *Kniphofia northiae* where only juvenile leaves show this trait), soft (mesophytic), not succulent (except *K. typhoides*), in basal rosettes, lacking spines, immaculate; inflorescence usually a simple, dense raceme or spike ..... **Kniphofia**
  4b Leaves cymbi- or crescentiform in cross section, ± succulent, in basal or apical rosettes or cauline, hard, often spiny and/or distinctly to indistinctly maculate with spots or tubercles:
    5a Capsules apically acute; leaves narrowly linear, margin with dense, small, retrorse teeth; underground parts bulbous; flowers usually <15 mm long, irregular ..... **Chortolirion**
    5b Capsules apically rounded or obtuse; leaves usually thickly succulent, deltoid to lanceolate, margin mostly variously armed with soft or pungent spines; underground parts rhizomatous or stoloniferous (if rarely bulbous then flowers >15 mm long, regular):
      6a Perianth segments apically connivent ..... **Poellnitzia**
      6b Perianth segments apically spreading or recurved:
        7a Flowers pendulous at anthesis; perianth tube curved upwards at apex ..... **Gasteria**
        7b Flowers erect, suberect or spreading at anthesis; perianth tube straight or curved downwards at apex:
          8a Perianth bilabiate, <15 mm long, mouth declined ..... **Haworthia**
          8b Perianth regular (if rarely weakly bilabiate then flowers >15 mm long), mouth upturned:
            9a Flowers usually brightly coloured, fleshy; stamens as long as or longer than the perianth ..... **Aloe**
            9b Flowers dull-coloured, flimsy; stamens included ..... **Astroloba**

Aloe L. 1026000

Linnaeus: 319 (1753) in part fide Duval: 6 (1809); Baker: 302 (1896–1897); Berger: 159 (1908); Reynolds: 103 (1950); Phillips: 148 (1926); Phillips: 186 (1951); Sölch *et al.*: 10 (1970); Van Wyk & Smith: 8 (1996).

Chamaealoe A.Berger: 43 (1905); Berger: 120 (1908). *Leptaloe* Stapf: t. 9300 (1933). *Aloinella* Lemée: 27 (1939) not of Cardot. *Guillauminia* A.Bertrand: 41 (1956). *Lemeea* P.V.Heath: 153 (1993).

Dwarf acaulescent to massively caulescent, slow-growing, rarely bulbous, succulent perennials, up to 20 m tall, erect, decumbent, scandent, rarely pendulous, occasionally terminally branched, solitary or proliferating from base to form dense groups; roots succulent, terete, or rarely fusiform. **Leaves** succulent, rosulate, multifarious or distichous (rarely permanently so or in juvenile state only), multiannual or deciduous (mainly *Aloe* sect. *Graminialoe* and *A. buettneri*), erectly spreading to strongly recurved, ovate-acuminate, long-deltoid, lanceolate, triangular, narrowly linear to ensiform from a tubular amplexicaul base, often maculate; both surfaces smooth, asperulous or spiny; margins mostly dentate, rarely entire, sometimes ciliate; apex acute or acuminate, rarely retuse, usually ending in a single prickle. **Inflorescence** a densely to laxly flowered raceme or panicle, 1–many per plant, long-cylindrical, subspicate, capitate or corymbose; erectly spreading to horizontal, 0.1–3 m tall; peduncle terete and herbaceous or massive and woody; bracteate; many flowers opening simultaneously. **Flowers** tubular, straight to ± curved, rarely somewhat bilabiate, cylindrical or constricted above ovary, sometimes clavate, cylindric-campanulate, often bulbous at base (especially *Aloe* sect. *Pictae*); pedicellate. **Perianth** segments with apices free, coherent above when wilted, yellow, orange, red, brown, whitish or greenish, often 2- or even 3-coloured, buds and open flowers often differing in colour. **Stamens** included or exserted; filaments subulate, slightly filiform-flattened, often same colour as perianth. **Ovary** oblong-ovoid to globose, with many axile ovules; style filiform; stigma capitate, minute, becoming well-exserted, usually considerably exceeding anthers after anthesis. **Capsule** erect, cylindrical, oblong to obtusely ovoid, apically truncate, chartaceous to woody when dry. **Seeds** dark brown, grey to black, irregularly angled, laterally compressed, obscurely winged but sometimes with distinct white, papery wings (*A. variegata*). $x = 7$ (polyploidy).

Species ± 500, widespread in Africa, Arabian Peninsula, Socotra and Madagascar, naturalised in Australia, the Mediterranean, India, China,

South America and Carribean Islands; ± 130 in sthn Afr., widespread in all countries and provinces.

Astroloba Uitewaal 1028010

Uitewaal: 53 (1947); Groen: 51 (1987).

Haworthia Duval: 7 (1809) in part; Parr: 145 (1971). *Apicra* Willd.: 167 (1811) in part; Baker: 329 (1896–1897); Berger: 115 (1908); Phillips: 149 (1926); Uitewaal: 25 (1939); Phillips: 187 (1951).

Small, caulescent, succulent perennials, proliferating from base or subterranean stolons to form small or large clusters, 0.2–0.5 m tall; creeping or supported by surrounding vegetation, branched from base; roots succulent, terete. **Leaves** many, distinctly succulent, leathery; spirally arranged, imbricate, basally amplexicaul, deltoid-acuminate, triangular, erectly spreading, both surfaces smooth or tuberculate; lower surface usually with a distinct acentral keel; margins smooth or denticulate; apex acute, sometimes terminating in a mucro. **Inflorescence** a laxly flowered raceme or panicle, erectly spreading; peduncle smooth, simple or branched; sterile bracts membranous, persistent, triangular to long-acuminate, erect, small; floral bracts membranous, long-acuminate sometimes mucronate, keeled with 1–3 brownish green or pinkish central nerves, clasping pedicels; pedicels short, ascending, persistent, thin, pinkish brown, shorter than perianth. **Flowers** small, tubular, ± regular, ± straight, ascending, few to many, pedicellate or rarely sessile. **Perianth** segments fused below, contiguous above, limb short, usually monochrome with colours muted, drab greenish white, rarely cream, beige, yellow or pink, distinctly veined, lobes short, straight, apices free, three inner segments dorsally adhering to outer segments, margins free, membranous to fleshy, cohering above when wilted, circumscissile below; bud narrow, straight. **Stamens** included. **Ovary** oblong, sessile, with many axile ovules; style subulate; stigma minute, apical. **Capsule** erect, cylindric, oblong to obtuse or ovoid to acuminate, chartaceous to woody when dry. **Seeds** small, dark brown to black, irregularly angled, laterally compressed, angles obscurely winged, ± 4 mm long. $x = 7$ (polyploidy).

Species ± 7, Western and Eastern Cape.

Bulbine Wolf 0985000

Wolf: 84 (1776) name conserved; Willdenow: 372 (1809) ; Baker: 359 (1896–1897); Phillips: 183 (1951); Sölch *et al.*: 33 (1970); Baijnath: 276 (1977).

Succulent perennial herbs or subshrubs, rarely annual; up to 1.8 m high; rootstock tuberous, cormose or rarely bulb-like, frequently rhizomatous; roots slender, fibrous or rarely fusiform; stems with circular leaf scars, branching freely, or basal, or vestigial. **Leaves** 1–many, sometimes subdistichous, rarely distichous, usually in a basal rosette but aggregated or spreading along stem in caulescent forms, glabrous or margins occasionally hairy, erect, spreading or prostrate, terete, triangular or dorsiventrally flattened, rarely flexuous or spirally twisted; apex truncate, tapering to a point or mucronate; some outer leaves scale-like; leaf bases broadened, with transparent wings extending into a tubular sheath. **Inflorescence** a lax or compact raceme, sometimes somewhat corymbose, 1–many per plant, normally upright, usually overtopping leaves; peduncle usually terete, ± glabrous. **Flowers** few to many; pedicels usually slender, persistent, erect, erecto-patent, nonfruiting pedicels frequently recurved, not articulated; bracts membranous, shorter or as long as pedicel, margins usually entire, sometimes hairy. **Perianth** stellate; segments free, spreading or reflexed, oblong, 1-nerved, yellow or rarely white, orange or pink; outer whorl narrower than inner, deciduous, cohering apically when withered, circumscissile below, with a small annulus persisting below ovary; shows diurnal movement. **Stamens** erect, free; filaments slender and densely bearded in upper half. **Ovary** globose; with 2–many axile ovules; style terete, slender, papillate; stigma apical. **Capsule** globose, occasionally inflated and thin-walled, sometimes woody. **Seeds** 1–several per locule, black or brown, flattened or deltoid with margins sometimes winged, either smooth or tuberculate, often compressed and aborted during maturation. $x = 7, 12, 13, 14$ (aneuploids, polyploidy).

Species ± 50; Africa and Australia; ± 46 in sthn Afr., widespread in all countries and provinces.

Bulbinella Kunth 0984000

Kunth: 569 (1843); Baker: 355 (1896–1897); Perry: 431 (1987); Perry: 1 (1999).

Glabrous geophytes, with compact, short, unbranched, usually erect shoots up to 1 m high, surrounded at base by fibrous, often reticulate leaf bases, forming a long sheathing neck, and sometimes with truncate, membranous, tubular squamae; rhizomes covered with fibres; roots many, swollen and spongy or hard, often with tuberous swellings towards tips. **Leaves** basal, few to many, distichous, mesophytic, not succulent, filiform to linear and tapering to an acuminate tip, triquetrous to subterete or canaliculate; margin smooth, parallel veins prominent or masked, finely denticulate or ciliate. **Inflorescence** a simple, many-flowered, cylindrical, conical or subcorymbose raceme, dense to somewhat lax; scape naked, erect, unbranched, overtopping leaves; bracts solitary, basal, small; pedicels thin. **Perianth** stellate, segments free or connate at extreme base only, oblong, persistent; yellow, orange, white or cream-coloured. **Stamens** hypogynous; filaments subulate or filiform, apiculate, glabrous; anthers small, subglobose, dorsifixed, versatile. **Ovary** subglobose to ovoid, 2 ovules per locule, collateral; style terete; stigma small, apical. **Capsule** subglobose to ovoid, sessile or stipitate, topped with persistent style. **Seeds** 1 or 2 per locule, narrowly or broadly triangular, acute, black, sometimes with a silvery to yellow outer integument, narrowly or distinctly winged. $x = 7$.

Species 22, 6 in New Zealand; 17 in sthn Afr., Northern, Western and Eastern Cape.

Chortolirion A.Berger 1029010

Berger: 72 (1908); Phillips: 149 (1926); Phillips: 187 (1951); Smith: 430 (1988); Smith: 71 (1991); Smith: 31 (1995a).

Haworthia Duval: 7 (1809) in part; Obermeyer: 119 (1973); Dyer: 929 (1976).

Small, acaulescent, herbaceous, bulbous perennials; ± 150 mm tall, with leaves originating from a short, simple (rarely once-branched), cylindrical, subterranean butt; bulb ovoid-oblong, ± 20 mm in diameter, with few scales; roots succulent, few, fusiform. **Leaves** succulent, slender, grass-like, flaccid, erect, deciduous, usually once or twice twisted, immaculate or with few to many white spots near base; margins armed with soft, white, decurved teeth; upper portion of leaves often dry. **Inflorescence** a laxly flowered raceme, erect, ± 360 mm tall; peduncle terete and herbaceous, simple; bracteate, few flowers open simultaneously. **Flowers** small, pedicellate, bilabiate; tube straight, base obtuse, indistinctly curved downwards and outwards, ascending. **Perianth**: segments fused below, contiguous above, greenish, brownish or pinkish white, lobes short, recurved, apices free,

cohering above when wilted, circumscissile below. **Stamens** included. **Ovary** oblong, with many axile ovules; style subulate; stigma minute, apical, included. **Capsule** erect, apically acute, chartaceous when dry. **Seeds** small, dark brown to black, irregularly angled, shortly winged. $x = 7$.

Monotypic: *Chortolirion angolense* (Baker) A.Berger, widespread in the summer-rainfall region of sthn Afr.; also in Angola and Zimbabwe.

Gasteria Duval 1027000

Duval: 6 (1809); Baker: 286 (1896–1897); Berger: 122 (1908); Phillips: 148 (1926); Phillips: 186 (1951); Schelpe: 17 (1958); Sölch *et al.*: 49 (1970); Van Jaarsveld: 6 (1992); Van Jaarsveld: 33 (1994); Van Jaarsveld *et al.*: 468 (1994); Van Jaarsveld: 65 (1998).

Acaulescent to shortly stemmed, succulent perennials; decumbent or erect, rarely pendulous; solitary or proliferating from base; 0.15–1 m tall. **Leaves** succulent, distichous in juvenile stage (which may persist), spirally arranged or rosulate, lorate, lanceolate to ensiform or deltoid; erectly spreading to strongly recurved; both surfaces smooth or rugulose, tubercles white or greenish; usually with distinct adaxial acentral keel; margins acute or rounded, marginal tubercles often merging apically to form continuous white band; apex acute, rarely retuse, mucronate. **Inflorescence** a laxly flowered raceme or panicle; erectly spreading to horizontal, often pink in upper half; bracteate. **Flowers** tubular, usually markedly bulbous (gasteriform) at base for up to two-thirds of its length, curved upwards and outwards, usually borne pendulously secund, pedicellate. **Perianth** segments with apices free, fused above when wilted; usually 3-coloured, reddish pink, green and with short, yellow or white-tipped lobes, rarely nearly white or uniformly pink with yellow. **Stamens** included or barely exserted; filaments white, filiform, slightly flattened. **Ovary** oblong-ovoid, with many axile ovules; style filiform; stigma minute, becoming shortly exserted, exceeding anthers after anthesis. **Capsule** erect, green, cylindric, oblong to oblong-ovoid, apically truncate, chartaceous to woody when dry. **Seeds** dark brown to black, irregularly angled, laterally compressed, obscurely winged. $x = 7$.

Species 18 and varieties 8, sthn Afr., mainly in the Western and Eastern Cape, with outliers in Namibia, Northern Cape, Mpumalanga, KwaZulu-Natal; also in Mozambique.

Haworthia Duval 1029000

Duval: 7 (1809) name conserved; Baker: 332 (1896–1897); Berger: 74 (1908); Phillips: 149 (1926); Phillips: 187 (1951); Sölch *et al.*: 50 (1970); Bayer: 12 (1976); Bayer: 17 (1982); Scott: xviii (1985); Bayer: 1 (1999).

Small, acaulescent to shortly stemmed, succulent perennials, 5–300 mm high, erect or creeping, rarely pendulous, branched from base; solitary or proliferating from base or subterranean stolons to form small or large clusters; sometimes sunken into ground; roots succulent, terete, or rarely fusiform. **Leaves** succulent, rosulate, spirally arranged or rarely distichous, imbricate, erectly spreading to strongly recurved, deltoid-acuminate, lanceolate, triangular, narrowly linear or rarely lorate from a tubular amplexicaul base, often distinctly windowed; both surfaces smooth, asperulous, tuberculate or very rarely pubescent; margins denticulate or smooth, sometimes ciliate, acute or rounded; apex acute, truncate, obtuse, or retuse, sometimes mucronate. **Inflorescence** a densely to laxly flowered raceme or panicle, erect to erectly spreading, peduncle terete and herbaceous, bracteate; few flowers opening simultaneously. **Flowers** small, pedicellate, ascending. **Perianth** tubular, usually bilabiate, rarely regular, tube ± straight, usually slightly obtuse (not gasteriform) at base, indistinctly curved downwards and outwards, segments fused below, contiguous above, lobes short, strongly recurved, apices free, cohering above when wilted, circumscissile below, usually monochrome with colours muted, white or drab greenish grey, rarely slightly pinkish (*H. herbacea*) or yellowish (*H. nortieri*). **Stamens** included or barely exserted. **Ovary** with many axile ovules; style subulate; stigma minute, apical, included. **Capsule** erect, cylindrical, oblong to ovoid, apically obtuse, chartaceous to woody when dry. **Seeds** small, dark brown, grey to black, irregularly angled, obscurely winged. $x = 7$ (aneuploids, polyploidy).

Species ± 70, sthn Afr., the greatest diversity in the Western and Eastern Cape, with outliers in Namibia, Mpumalanga as well as Mozambique.

Kniphofia Moench 1024000

Moench: 631 (1794); Baker: 275 (1896–1897); Codd: 363 (1968).

Notosceptrum Benth.: 775 (1883); Phillips: 185 (1951).

Herbaceous perennials, tufted or solitary from a thick, simple or branched rhizome, rarely somewhat caulescent; up to 2(–4) m high. **Leaves** V-shaped in cross section, soft (mesophytic), rosulate, rarely distichous, linear, long-tapered to apex, usually carinate; margins smooth or minutely serrulate. **Inflorescence** a terminal, dense to lax, many-flowered, subspicate, simple or very rarely branched raceme; bracts scarious, persistent, longer than short pedicels; pedicels inconspicuously articulated. **Flowers** spreading or pendulous. **Perianth**: tube campanulate to cylindrical; lobes short; deciduous; white, yellow, brownish or various shades of red. **Stamens** as long as or longer than perianth at anthesis. **Ovary** sessile, with many axile ovules; style filiform, usually finally exserted; stigma capitate, minute. **Capsule** globose to ovoid, often triquetrous, chartaceous when dry. **Seeds** somewhat flattened, acutely 3-angled or winged; endosperm fleshy. $x = 6$.

Species ± 70; mostly Africa, 1 in Madagascar and 1 in S Arabian Peninsula; 47 in sthn Afr., widespread in all countries and provinces, except Namibia and Botswana.

Poellnitzia Uitewaal 1028020

Uitewaal: 61 (1940); Hunt: t. 804 (1981); Smith: 75 (1994); Smith: 35 (1995b); Smith & Van Wyk: 97 (1995).

Haworthia Duval: 7 (1809) in part; Dyer: 929 (1976).

Small, herbaceous, caulescent perennials; offsetting at and near base; stems mostly erect, up to 250 mm long; roots succulent, terete. **Leaves** succulent, short, hard, cauline, usually four-ranked in spirally arranged rows, squarrose-imbricate, ovate-squamiform; apex triquetrous, pungent-acuminate; lower surface keeled towards tip; margins and keel apex minutely scabrid. **Inflorescence** a laxly flowered, simple, bracteate raceme, borne horizontally, up to 0.5 m long. **Flowers** relatively large, borne secundly erect, narrowly tubular, upper one-third slightly decurved. **Perianth**: tube red to orange, segments connivent, reduplicate-valvate, tips of segments scarcely separated, margins apically minutely crenulate-erose, yellow, upper tenth of segments dark green. **Stamens** subequal, filaments light green. **Ovary** with many axile ovules; style straight; stigma minute, included or exserted. **Capsule** erect, cylindric, apically retuse, chartaceous when dry. **Seeds** small, dark brown to black, irregularly angled, shortly winged. $x = 7$.

Monotypic: *Poellnitzia rubriflora* Uitewaal, endemic to the Robertson Karoo in Western Cape.

Trachyandra Kunth 0985010

Kunth: 573 (1843); Baker: 378 (1896–1897) under *Anthericum*; Obermeyer: 711 (1962); Sölch *et al.*: 68 (1970).

Rhizomatous geophytes or rarely perennial suffrutices with much-branched stems, adorned with tubular persisting leaf bases, up to 1.8 m tall, glabrous, hairy or glandular-pubescent; roots various, fibrous or spindle-shaped, often swollen and fused, forming a compact tuberous, lobed organ, with attenuated ends. **Leaves** thickly leathery to somewhat succulent, rosulate, rarely distichous, or cauline and alternate, variously shaped, often terete, with a basal tubular sheath; shoots and/or leaf bases often enveloped by tubular membranous squamae. **Inflorescence** an axillary, simple or branched raceme, often with serial buds; scape usually naked; one bract per flower; pedicels not articulated, mobile. **Flowers** erect or pendulous; opening in afternoon, closing at night. **Perianth** stellate or recurved, deciduous, cohering apically when wilted, circumscissile below, leaving a shallow cup below capsule; usually white, rarely yellow, pink or mauve, dark-keeled, often bi-maculate below. **Stamens**: filaments retrorsely scabrid. **Ovary** with 2–16 ovules in each locule. **Capsule** rounded or sometimes stipitate through abortion of lower ovules. **Seeds** angled, brown or grey, with some scattered glands. $x = 7$.

Species ± 50, Africa; 49 in sthn Afr., widespread in all countries and provinces, mainly restricted to winter-rainfall area of Western Cape.

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Burmanniaceae

(Liliidae—Liliales)

Compiled by C. Archer

Small, delicate, perennial, usually saprophytic, herbs. **Leaves** basal or reduced to scales. **Flowers** bisexual, regular, solitary, or in a bifurcate cyme. **Perianth** corolla-like, usually 6-lobed, fused at base into a 3-winged tube; inner lobes smaller than outer or sometimes 0. **Stamens** 3–6, arising from perianth tube, sessile or subsessile; anther with 2 widely separated thecae; connective dilated. **Ovary** inferior, 3-locular, with axile placentas; ovules many, minute; style shortly 3-lobed. **Fruit** a ± 3-winged capsule, usually crowned with dry perianth, opening by longitudinal slits. **Seeds** minute. $x = 6$ (1 report).

Genera ± 15, species 125, ± cosmopolitan in tropics and subtropics; sthn Afr.: genus 1, species 1.

Wright: 2 (1912); Hutchinson: 841 (1973).

Burmannia L. 1382000

Linnaeus: 287 (1753); Wright: 2 (1912); Obermeyer: t. 1427 (1964).

Description as for family.

Species ± 20, ± cosmopolitan in tropics and subtropics; sthn Afr. 1: *Burmannia madagascariensis* Mart., North-West, kloofs of Magaliesberg and in KwaZulu-Natal.

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*Cannaceae

(Zingiberidae—Zingiberales)

Compiled by C. Archer

Rhizomatous glabrous herbs. **Stems** tall, annual. **Leaves** alternate, with sheathing bases; large, pinnately veined with a prominent midrib, decreasing in size upwards; ligule 0. **Inflorescence** terminal, spicate or thyrsoid; bracts usually small, green. **Flowers** bisexual, irregular, large. **Sepals** 3, free, short, ovate to lanceolate, green or subpetaloid, persistent. **Petals** 3, longer than sepals, shortly connate at base, lanceolate to linear, 1 smaller than others, petaloid. **Stamen** 1, petaloid, bearing a half anther laterally; staminodes 1–4, petaloid, more conspicuous than petals, one next to stamen forming a lip. **Ovary** inferior, 3-locular, verrucose with many axile ovules; style petaloid with an oblique terminal stigma. **Capsule** triangular, verrucose. **Seeds** usually freed by deterioration of capsular tissues, globose, hard, dark. $x = 9$.

Genera 1, species 50–60; widespread in tropical and subtropical Central America.

Winkler: 640 (1930); Hutchinson: 727 (1973).

*Canna L. 1363000

Linnaeus: 1 (1753); Winkler: 640 (1930).

Description as for family.

Species 1: *Canna indica* L. (Indian Shot) naturalised in warm, moist parts of sthn Afr., possibly introduced for use of the seeds in rattles; *Canna* x *generalis* L.H.Bailey is an occasional garden hybrid.

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Colchicaceae

(Liliidae—Liliales)

Compiled by N.L. Meyer

Erect or climbing geophytes; with subterranean, starch-rich corms to tubers, sometimes stoloniferous. **Leaves** few and basally concentrated, or several on short leafy stem, alternate, distichous, verticillate or crowded, or many and scattered on a long, sometimes branched stem; dorsiventral, linear or lanceolate, sessile, sheathing at base, parallel-veined, rarely ending in tendril. **Stems** usually stiff and erect, sometimes climbing, ending in racemes or rarely in a single flower. **Flowers** regular, bisexual, 3-merous, hypogynous. **Perianth** 3 + 3, similar, free or basally connate, with basal nectaries. **Stamens** 3 + 3; filaments free, narrow or basally broad, glabrous; anthers 2-thecous, dehiscing longitudinally, extrorse or introrse. **Ovary** superior, 3-locular; with axile placentas; ovules several to many; styles 3, or 1 with 3 stigmatic branches. **Fruit** usually a septicidal capsule. **Seeds** globose or ovoid.

Genera 17, species 170, widespread in Old World; sthn Afr.: genera 12, species ± 67.

Dahlgren *et al.*: 226 (1985); Thulin: 67 (1995).

Chemically characterised by the absence of steroidal saponins and oxalate raphides, but chelidonic acid and alkaloid bases (e.g. colchicine) are present in most.

Key to genera

1a Leaf apex attenuated into a recurved tendril, or aristate; leaves cauline, alternate on usually scandent annual stems, herbaceous or leathery; flowers solitary, with a leaf placed beside them, or unattended:
2a Perianth segments fused; tube campanulate ..... **Sandersonia**
2b Perianth segments free:
3a Perianth segments recurved; style at right angles to ovary ..... **Gloriosa**
3b Perianth segments not recurved; style straight ..... **Littonia**
1b Leaf apex not cirrhiferous; leaves basal, rosulate or distichous; flowers variously arranged:
4a Flowers ebracteate, at least upper ones; styles 3(4):
5a Perianth segments fused basally ..... **Wurmbea**
5b Perianth segments free:
6a Perianth pedicellate; segments clawed; basal nectaries absent ..... **Baeometra**
6b Perianth sessile; segments expanded at base with nectaries:
7a Styles arising centrally on ovary ..... **Onixotis**
7b Styles arising laterally on truncate ovary lobes ..... **Neodregea**
4b Flowers bracteate; styles 3 or 1:
8a Flowers in a capitulum overtopped by exterior green or petaloid bracts ..... **Androcymbium**
8b Flowers not in a capitulum:
9a Flowers 2–6, in a spreading apical umbel, on long pedicels; perianth segments with a short basal spur ..... **Hexacyrtis**
9b Flowers solitary or cymose (with bracts placed opposite flowers) :
10a Perianth persistent; ovary with 3 long, spreading styles ..... **Ornithoglossum**
10b Perianth caducous; ovary with a short or long style:
11a Filaments filiform; style very short; stigmas 3, revolute, papillate ..... **Iphigenia**
11b Filaments with a thick bulge in middle; style long; stigma terminal ..... **Camptorrhiza**

Androcymbium Willd. 0969000

Willdenow: 21, t. 2 (1808); Baker: 516 (1897); Krause: 512 (1921); Sölch *et al.*: 20 (1970); Müller-Doblies & Müller-Doblies: 551 (1998).

Acaulescent or scapose geophytes. **Corms** deep-seated, asymmetrical, covered with hard dark tunics; new corms producing a basal lateral bulge, with tunics extended below into a broad, downward fold where roots emerge fan-wise. **Shoots** usually forming long neck enclosed in tubular, truncate, gaping sheath, acaulescent or produced into leafy scape. **Leaves** 2–many, distichous, linear to ovate-acuminate, canaliculate with a broad sheathing base; acaulescent species with leaves spreading at ground level and sessile inflorescence in centre. **Flowers** (1–)many in a terminal capitulum surrounded by, often large, petaloid, colourful bracts, the whole resembling one flower; pedicels and bracts present. **Perianth**: segments free, ovate-acuminate, margins involute, with a pair of nectaries above claw. **Stamens** arising from claw, exserted or included; anthers basifixed, introrse. **Ovary** ovoid, deeply 3-sulcate, each locule attenuated into a style ending in a minute stigma; ovules many. **Capsule** 3-sulcate, ovoid-acuminate, topped with 3 subulate style bases, or obtusely obovoid, with style bases divergent, septicidally 3-valved. **Seeds** globose or angled by pressure, minutely verrucose. $x = 9$ (8) (polyploidy).

Species ± 40, 1 in North Africa and 1 in Mediterranean region; ± 28 in sthn Afr., widespread in all countries and provinces.

Baeometra Salisb. ex Endl. 0970000

Salisbury: 330 (1812); Endlicher: 136 (1836); Baker: 522 (1897); Adamson: 202 (1950).

Geophytes. **Corms** asymmetrically ovoid, covered by thin, dark brown tunics; new corms developing a basal bulge, with tunics forming a downward fold below, through which roots appear. **Shoot** usually forming a sheathing neck below ground, scapose above. **Leaves** ± 6, distichous, linear, canaliculate, sheathing, upper merging into bracts. **Flowers** in a scorpioid, 1–7-flowered cyme; pedicels with discoid, scalloped apex. **Perianth** segments free, erect, yellow inside, purple at base, red outside, deciduous. **Stamens** arising from claw, shorter than segments; anthers versatile, introrse. **Ovary** cylindric, with many ovules; styles 3, short, falcate, laterally stigmatose. **Capsule** cylindric, trigonous, septicidal. **Seeds** globose. $x = 11$.

Species 1: *Baeometra uniflora* (Jacq.) G.J.Lewis, Western Cape. Reported as poisonous to cattle.

Camptorrhiza Hutch. 0975010

Hutchinson: 101 (1934); Phillips: t. 575 (1935); Obermeyer: 86 (1961); Sölch *et al.*: 35 (1970).

Slender geophytes. **Corms** asymmetrically ovoid, often with a lateral, horizontal, geniculate tuber (stolon) attached to it. **Stem** sheathed by tubular spathe below. **Leaves**: lowest 1 or 2 with free tubular sheaths and a linear, canaliculate blade; upper leaves sessile, decurrent. **Flowers** 3–12, in a lax scorpioid cyme; rachis flexuose; pedicels long, erect, recurved in fruit. **Perianth**: segments free, deciduous, oblong, concave, with involute margins, reflexed at anthesis. **Stamens** hypogynous; filaments short, with an orbicular swelling in the middle; anthers versatile, with thecae placed horizontally at anthesis. **Ovary** ovoid, trigonous, with many ovules; style simple; stigma apical, minute. **Capsule** globose to cylindrical. **Seeds** globose, brown, with a thick ventral raphe.

Species 1: *Camptorrhiza strumosa* (Baker) Oberm., Zimbabwe and Mozambique; Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland and KwaZulu-Natal.

Gloriosa L. 0963000

Linnaeus 305 (1753); Baker: 525 (1897); Sölch *et al.*: 50 (1970); Field: 243 (1972).

Climbing or erect geophytes. **Corms** abruptly bent. **Stems** supple, scandent. **Leaves** cauline, sessile, alternate or crowded in places, simple, linear to ovate, attenuated into a terminal, recurved tendril. **Flowers** ± nodding, on upper part of stem on long pedicels, placed beside a leaf or unattended. **Perianth**: segments free, equal, narrowly ovate-acuminate, often crisped, reflexed, persistent, yellow or red. **Stamens** hypogynous; filaments firm, terete, spreading; anthers 2-thecous, versatile. **Ovary** ovoid to oblong; ovules many; style filiform, bent sharply outwards at base, with 3 short stig-

matic arms. **Capsule** ovoid or cylindrical, 3-valved, septicidally dehiscent, leathery. **Seeds** globose, bright red, fleshy. $x = 11$ (14).

Species ± 6, closely related, Africa, Asia; 1 in sthn Afr.: *Gloriosa superba* L. (*G. virescens* Lindley is regarded as a subspecies), Namibia, Botswana, Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Hexacyrtis Dinter 0965010

Dinter: 84 (1932); Sölch *et al.*: 51 (1970).

Psammophilous geophytes. **Corms** deep-seated, globose, covered with reticulated fibres, sarmentose; roots spongy, piercing tunics. **Stem** simple, erect, with a long neck of old sheathing leaf bases. **Leaves** ± 6, distichous, sheathing stem, linear-acuminate, canaliculate, glanduliferous. **Inflorescence** terminal, compound, with 4–6 branches, each terminating in a 2–6-flowered umbel surrounded at base by ovate bracts. **Flowers** somewhat campanulate, pendulous, on long, patent pedicels with recurved tips. **Perianth**: segments free except at base, spreading above, forming a short spurred tube below, with incurved, enlarged side lobes. **Stamens** hypogynous; filaments short; anthers 2-thecous, extrorse, versatile. **Ovary** globose, obtusely trigonous; ovules many; style with 3 long stigmatic branches. **Capsule** obtusely globose, trigonous, loculicidal. **Seeds** globose.

Species 1: *Hexacyrtis dickiana* Dinter, Namibia.

Iphigenia Kunth 0975000

Kunth: 212 (1843); Baker: 561 (1898); Obermeyer: 84 (1961); Sölch *et al.*: 52 (1970).

Slender geophytes. **Corms** ovoid, covered with thin, dark tunics. **Stem** straight or flexuose, with 1 or 2 tubular, basal spathes. **Leaves**: lowest 1–3 with free tubular sheathing bases and linear to filiform blades, spirally arranged; upper leaves sessile, decurrent, placed beside flower. **Flowers** 3–10, in a lax scorpioid cyme; pedicels recurved. **Perianth**: segments free, deciduous, linear. **Stamens** hypogynous; filaments short, filiform; anthers basifixed, extrorse. **Ovary** ovoid, with many ovules; style very short, with 3 falcate, stigmatic, papillate branches. **Capsule** ovoid to cylindrical, loculicidal. **Seeds** small, globular, papillate, with a distinct raphe. $x = 11$ (10).

Species ± 15, Africa, Madagascar, India, Australia, New Zealand; 1 in sthn Afr.: *Iphigenia bechuanica* Baker, Namibia, Botswana, Northern Province, Mpumalanga, KwaZulu-Natal.

Littonia Hook. 0964000

Hooker: t. 4723 (1853); Baker: 527 (1897).

Climbing geophytes with small tubers bearing short spreading lobes. **Stems** usually simple, scandent or erect. **Leaves** cauline, verticillate below, alternate above, linear to ovate, apex attenuated into a recurved tendril or aristate. **Flowers** cymose, on upper part of stem; pedicels long, arising beside a leaf or unattended. **Perianth** equal, persistent, ascending, slightly saccate at base, yellow. **Stamens** short, filiform; anthers 2-thecous, erect, basifixed. **Ovary** ovoid, trigonous; ovules many; style short, terete, with 3 short falcate stigmatic branches. **Capsule** ovoid, 3-valved, septicidally dehiscent, leathery. **Seed** globose, fleshy, red, on long funicles. $x = 9, 11$ (1 report each).

Species 8, Africa, Arabian Peninsula; 2 in sthn Afr., *Littonia modesta* Hook. and *L. rigidifolia* Bredell, widespread, except Free State, Lesotho, Northern and Western Cape.

Neodregea C.H.Wright 0971010

Wright: 308 (1909); Hooker: t. 2931 (1913); Garside: 292 (1935).

Small, umbraticolous geophytes. **Corms** asymmetrical, obovoid; young corms producing lateral basal bulges and tunics forming a fold at base from which roots emerge fan-wise. **Stem** with a basal neck covered by sheaths, simple above. **Leaves** 3: basal one spreading, linear, with sheathing part gaping above, second leaf smaller, opposite, and third leaf bract-like below lowest flower of spike. **Flowers** 1–3. **Perianth**: segments narrowly linear-ovate, aristate, auriculate above claw, persistent, reflexed in fruit. **Stamens** arising on claw, short, dorsifixed, introrse. **Ovary** ovoid; ovules several; styles 3, long, arising laterally on truncate ovary lobes; stigmas apical, minute. **Capsule** trigonous, with apical flat part of locules diverging in fruit, bearing persistent incurved, pointed style bases on outside. **Seeds** globose, lenticular.

Species 1: *Neodregea glassii* C.H.Wright, from Port Elizabeth (Eastern Cape) to Somerset West (Western Cape). Closely allied to *Androcymbium*, where, in some species, the capsule and style bases assume a similar outward position.

Onixotis Raf. 0971000

Rafinesque: 32 (1837); Mabberley: 600 (1980).

Dipidax Salisb.: 54 (1866); Bentham & Hooker: 824 (1883); Baker: 523 (1897); Adamson: 202 (1950); Leinfellner: 445 (1960).

Terrestrial geophytes sometimes inhabiting seasonal marshes. **Corms** asymmetrical, covered with thin dark brown tunics; new corms with a basal bulge, with tunics forming a downward fold over bulge through which roots appear fan-wise. **Shoot** forming a neck covered with old leaf bases. **Leaves** 1 or 2, basal one narrowly to broadly linear, sheathing, upper leaf reduced to inflated, sheathing bract. **Flowers** in a scorpioid cyme, ebracteate, usually many, sessile, alternate on a somewhat zigzag rachis. **Perianth**: segments free, equal, ovate, auriculate below, with 2 dark nectaries forming a tube or groove down each side of claw, deciduous, falling with stamens, white or pink or pink-spotted. **Stamens** arising at base of perianth segments; anthers purple, versatile, introrse. **Ovary** ovoid or obovoid, trisulcate, with many ovules; styles 3, arising centrally on ovary, filiform; stigma apical, minute. **Capsule** obtusely ovoid, or obovoid, angled and triumbonate, topped with persistent style bases. **Seeds** subglobose, angled through pressure. $x = 10$ (1 report).

Species ± 4, 2 in sthn Afr.: *Onixotis punctata* (L.) Mabberley, a terrestrial species and *O. triquetra* (L.f.) Mabberley, in marshes, Western Cape.

Ornithoglossum Salisb. 0973000

Salisbury: text to t. 54 (1806); Baker: 524 (1897); Leinfellner: 474 (1960); Sölch *et al.*: 62 (1970); Nordenstam: 1 (1982).

Glabrous geophytes. **Corms** deep-seated, tuberous, subglobose to ovoid, simple or with 1 or 2 lateral blunt lobes, firm, white inside, covered with thin yellowish or dark papery tunics, long, sheathed neck below ground. **Stem** erect, variable length, simple or branched, with sheathing leaves, terminating in a bracteate, racemose inflorescence. **Leaves**: lowest a membranous, sheathing, tubular cataphyll, without leaf blade, truncate or terminated by a short, ovate, usually mucronate tip; cataphyll sometimes worn away or undeveloped; upper leaves 2–12, alternate, distichous, erecto-patent to recurved, linear or linear-lanceolate to broadly lanceolate from a stem-sheathing base, tapering to acuminate, acute or mucronate tip, flat or undulate, parallel-veined, green or glaucous to greyish green. **Inflorescence** a few- to many-flowered raceme, oblong to pyramidal or corymbosely contracted; bracts leaf-like, simple; pedicels axillary, but basally coalescent with stem, erecto-patent to spreading or reflexed, often sharply recurved near apex. **Flowers** cernuous or nodding. **Perianth** regular or asymmetric, discrete, persistent, equal, all or some becoming patent

to reflexed, with a basal tubular or flattened claw; blade flat, simple, lanceolate, acute or obtuse, various shades from yellow to almost black. **Nectary** a channel-, pouch- or pocket-like structure in the claw or between claw and blade, its upper margin simple or sometimes projecting as a tongue, or mouth-, ring- or funnel-shaped. **Stamens** free; filaments arising at base, arcuate, filiform, or swollen at or below middle; anthers dorsifixed, versatile, dehiscing extrorsely with longitudinal slits. **Ovary** globose to ovoid to oblong, sessile, simple; ovules few to many; styles 3, free, filiform, arcuate or spreading; stigma small, capitate or oblong and apical. **Capsule** globose to obovoid, nodding, coriaceous, dehiscing loculicidally. **Seeds** several, globose, firm, brown, smooth or rugose, with a distinct raphe. $x = 12$.

Species 8, tropical and sthn Afr., all countries and provinces, except Swaziland, KwaZulu-Natal and Lesotho. Poisonous to stock.

Sandersonia Hook. 0965000

Hooker: t. 4716 (1853); Baker 6: 526 (1897).

Erect or scandent geophytes. **Corms** small, bearing short spreading lobes covered with thin tunics. **Stems** simple, striate, supple. **Leaves** close together, alternate, clasping below, linear to narrowly ovate-acuminate; tip cirrhiferous or aristate. **Flowers** cymose, on upper part of stem, placed beside a leaf on long, arcuate pedicels. **Perianth** tubular, urceolate, pendulous, persistent, shortly 6-spurred at base; lobes short, triangular, recurved. **Stamens** short, included; anthers 2-thecous, introrse, basifixed. **Ovary** ovoid, obtusely trigonous; ovules many; styles 3, free; stigma apical. **Capsule** obtusely ovoid, trisulcate, enclosed in perianth. **Seeds** globose, verrucose, with large broad funicle. $x = 12$.

Species 1: *Sandersonia aurantiaca* Hook., Mpumalanga, Swaziland, KwaZulu-Natal to Eastern Cape.

Wurmbea Thunb. 0972000

Thunberg: 18, t. 1 (1781); Baker: 521 (1897); Nordenstam: 173 (1964); Nordenstam: 211 (1978); Nordenstam: 1 (1986).

Glabrous geophytes. **Corms** usually deep-seated, tuberous, ovoid to ellipsoid to subglobose, with many basal roots, covered by thin dark tunics with a long subterranean neck; new corms forming a lateral basal bulge with tunics produced in a downward-spreading fold through which roots spread out, covered with tubular sheaths from which a cormlet may emerge; membranous, stem-sheathing cataphyll sometimes present. **Stem** erect, solitary, simple, solid, short or long. **Leaves** 2 or 3(4), all cauline or one basal intravaginal, alternate, spirally arranged, cauline leaves with a tightly stem-sheathing portion, leaf blade suberect to spreading or recurved, filiform to linear to lanceolate to ovate, attenuate from ± dilated base, somewhat channelled with flat margins, parallel-veined, green or glaucous, margins sometimes ciliolate, tip acute, acuminate or mucronate. **Inflorescence** an ebracteate, spike-like scorpioid cyme, one- or few- to many-flowered, oblong or ovoid to narrowly oblong-cylindrical. **Flowers** sessile, closely to distantly spaced. **Perianth** persistent, segments 6(–8), basally connate, often to a distinct cylindrical or cup-shaped tube, sometimes minutely spurred basally; segments suberect or erecto-patent to spreading or reflexed, ovate to lanceolate to linear-lanceolate, obtuse or acute, often with a coloured spot about or below middle. **Nectary** usually present, groove-like, sometimes with elevated margins. **Stamens** 6(–8), distinct; filaments arising at segment base, subulate to filiform; anthers dorsifixed or rarely basifixed, versatile, bilocular, oblong to elliptic, dehiscing latrorsely with longitudinal slits. **Ovary** syncarpous or hemisyncarpous, 3(4)-carpellate, normally 3-locular and somewhat 3-lobed, sessile, with several to many ovules; styles 3(4), distinctly or indistinctly set off from ovary, filiform to subulate, suberect to spreading, with a small or elongate apical stigma. **Capsule** ovoid to ellipsoid to oblong, dehiscing septicidally or rarely loculicidally, entirely or to ± half its length. **Seeds** several to many, globose, ± 1 mm in diameter, black or brown. $x = 11$ (5, 7).

Species ± 38, ± 19 in Australia; 18 in sthn Afr., Swaziland, Free State, KwaZulu-Natal, Northern, Western and Eastern Cape.

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Commelinaceae

(Commelindae—Commelinales)

Compiled by L. Fish

Perennials or annuals, often somewhat succulent; the perennials of diverse habits, sometimes rhizomatous or stoloniferous, very rarely forming a small bulb; roots adventitious, fibrous, thin or swollen. **Leaves** basal and/or cauline, distichous or spirally arranged, with a basal, usually closed sheath enveloping stem, often ciliate at mouth; blade simple, entire, often petiolate. **Inflorescence** terminal, terminal and axillary or rarely all axillary, composed of cymes which may be few, or many and aggregated into thyrses; sometimes subtended by or enclosed in spathaceous bracts. **Flowers** bisexual or bisexual and male, occasionally cleistogamous, regular or irregular. **Sepals** 3, free or united, usually ± equal and sepaline, occasionally petaline, persistent. **Petals** 3, free or united, equal or unequal, petaline, deliquescent. **Stamens** 3 + 3, all fertile or some modified into staminodes and bearing variously shaped antherodes, or 0, hypogynous or united with corolla; filaments glabrous or bearded; anthers basifixed, dorsifixed or versatile, opening with longitudinal slits or rarely by basal or apical pores. **Ovary** superior, 2- or 3-locular with 1–many axile ovules in each locule; ovules uniseriate or biseriate; style simple, usually slender; stigma apical, simple or rarely 3-lobed, small or capitate, rarely enlarged. **Fruit** a 2- or 3-valved capsule, rarely indehiscent or a berry. **Seeds** 1–many per cell, hilum dot-like or elongate, embryotega (lid-like thickening in seed coat becoming detached on germination) circular, dorsal to lateral, rarely terminal.

Genera ± 40, species ± 650, cosmopolitan in warm regions, a few of them widespread weeds; sthn Afr.: genera 7, species 40.

Brown: 268 (1810); Clarke: 7 (1897); Clarke: 25 (1901); Brückner: 1 (1926); Brückner: 159 (1930); Brenan: 349 (1966); Brenan: 22 (1968); Schreiber: 1 (1967); Faden: 381 (1985); Obermeyer & Faden: 23 (1985); Faden & Hunt: 19 (1991).

Only subfamily Commelinoideae occurs in the region, with two tribes: Commelineae and Tradescantieae.

Key to genera

1a Fertile stamens 6, filaments bearded; flowers mostly regular (tribe **Tradescantieae**):
- 2a Inflorescence axillary, perforating base of leaf sheath ..... **Coleotrype**
- 2b Inflorescence terminal or terminal and axillary, never perforating leaf sheath:
  - 3a Petals white, free; cymes regularly paired ..... ***Tradescantia**
  - 3b Petals pink or purple to violet, united basally into a tube; cymes usually not paired ..... **Cyanotis**

1b Fertile stamens 3, if 6(5), then filaments glabrous; staminodes 3(4); flowers irregular to regular (tribe **Commelineae**):
- 4a Inflorescence consisting of 1 or 2 cymes enclosed in or closely subtended by folded or obliquely funnel-shaped leafy spathe; staminodes typically with 4(–6)-lobed anthers ..... **Commelina**
- 4b Inflorescence not enclosed in spathe, consisting of 1 to many cymes; staminodes lacking or (if present) with 2- or 3-lobed anthers:
  - 5a Capsules 3-valved; fertile stamens 2 or 3; filaments bearded ..... **Murdannia**
  - 5b Capsules 2-valved; fertile stamens 3 or 6(5); all filaments glabrous or 2 bearded:
    - 6a Fertile stamens 6(5); ovary and capsule glabrous ..... **Floscopa**
    - 6b Fertile stamens 3; staminodes 3; ovary and capsule puberulous ..... **Aneilema**

Aneilema R.Br. 0899000

Brown: 270 (1810); Clarke: 12 (1897); Clarke: 62 (1901); Morton: 431 (1966); Schreiber: 2 (1967); Obermeyer & Faden: 36 (1985); Faden: 1 (1991).

Perennial or annual herbs of various habits, with fibrous or tuberous roots. **Leaves** distichous or spirally arranged, blade petiolate or sessile. **Inflorescence** a thyrse (sometimes reduced to a single cyme), terminal or terminal and axillary, rarely all axillary; bracteoles persistent, usually cup-shaped and perfoliate. **Flowers** bisexual, bisexual and staminate, or bisexual, staminate and pistillate, all types produced in same inflorescence, irregular, pedicelled. **Sepals** 3, free, ± equal, sepaline, predominantly green. **Petals** 3, free, petaloid, upper 2 (paired petals) clawed, lower one (medial petal) usually reduced and discolorous (rarely subequal and concolorous, but then different in form), deliquescent. **Stamens** 3, on lower side, medial one different in form and size from lateral ones; filaments all glabrous or laterals sparsely to densely bearded. **Staminodes** 3, on upper side; filaments glabrous; antherodes bilobed. **Ovary** 2- or 3-locular, dorsal locule suppressed or 1-ovulate, ventral locules each with 1–6 uniseriate ovules; style simple; stigma capitate or not enlarged. **Fruit** a capsule, usually dehiscent and 2-valved (rarely ± indehiscent), dorsal locule suppressed or 1-seeded, ventral locules each 1–6-seeded. **Seeds** with a linear hilum and lateral embryotega. $x = 10, 13 (14, 16, 29)$.

Species ± 62, mainly tropical Africa; 11 in sthn Afr., mainly in tropical and eastern regions: Namibia, Botswana, northern provinces of South Africa, Swaziland, KwaZulu-Natal and into Eastern Cape.

Coleotrype C.B.Clarke 0903000

Clarke: 120 (1881); Clarke: 13 (1897); Obermeyer & Faden: 49 (1985).

Perennial herbs. **Leaves** spirally arranged, sheathing at base. **Inflorescence** axillary, sessile, contracted cymes perforating base of leaf sheaths. **Flower** regular to slightly irregular. **Sepals** free or fused basally, equal. **Petals** fused, tubular, limb 3-lobed. **Stamens** 6, equal or unequal, arising from near throat of corolla tube; filaments usually bearded with long moniliform hairs. **Ovary** 3- locular, 1 or 2 superposed ovules in each locule. **Fruit** a loculicidal capsule. **Seeds** 1 or 2 per locule; hilum linear; embryotega lateral. $x = 9$.

Species 9, Africa and Madagascar; 1 in sthn Afr.: *Coleotrype natalensis* C.B.Clarke, Swaziland, KwaZulu-Natal and Eastern Cape.

Commelina L. 0896000

Linnaeus: 40 (1753); Clarke: 8 (1897); Clarke: 33 (1901); Morton: 507 (1956); Schreiber: 2 (1967); Obermeyer & Faden: 24 (1985).

Perennial or annual herbs; roots thin or swollen; stems branched, erect to spreading or rarely succulent; when perennial usually dying down in winter to a persistent knobbly crown with long hard roots (chamaephytes); sometimes with underground stolons bearing cleistogamous flowers often developing capsules and seeds (*C. benghalensis* L. and *C. forskaolii* Vahl). **Leaves** distichous or spirally arranged, blade sessile or petiolate, base often oblique, sheathing base usually ciliate at mouth. **Inflorescence** terminal, composed of 1 or 2, 1–6-flowered cymes, cymes enclosed in terminal or leaf-opposed, obliquely funnel- to boat-shaped spathe with either free margins or margins of proximal end fused, straight; spathe mucilaginous or dry inside when flowering; upper cyme 1(2 or 3)-flowered, usually male (with or without a pistillode) exserted on a long peduncle, in some species absent or represented by a vestigial peduncle, often enclosed within spathe; lower cyme included in spathe, borne on a short peduncle. **Flowers** 2–6, all bisexual or some male, irregular, just exserted in turn at anthesis; pedicels recurved inside spathe when in fruit; flowers open in morning for a few hours, soon deliquescent. **Sepals** sepaline, free or lower 2 fused. **Petals** free; upper 2 large, flat, long-clawed, blue, white or yellow or related colours; lower one reduced, often colourless or different in colour to others. **Stamens** 3, anterior one (lower) fertile, central one usually with a larger anther with a broad connective; (2)3 posterior (upper) staminodal, reduced; antherodes cruciform or variously deformed; filaments glabrous. **Ovary** 2- or 3-locular, 2 ventral locules, and 1 dorsal locule sometimes reduced to absent; ventral locules 1- or 2-ovulate, dorsal locule 1-ovulate or sterile. **Fruit** a loculicidal capsule; in some species dorsal locule indehiscent, smooth or striate-muricate with capsule wall fused to seed and laterally attached to part of walls of ventral locules, forming a shallow cup. **Seeds** (2–)5, globose, ellipsoid or cylindric-truncate; testa various; hilum linear; embryotega lateral. $x = 10, 11$ (8, 9, 12, 13, 14).

Species ± 170, warmer countries of the world; 16 in sthn Afr., widespread. Capsule and seeds are important for the identification of species; the shape of the seed and its testa are typical for the species.

Cyanotis D.Don 0904000

Don: 45 (1825); Clarke: 13 (1897); Clarke: 788 (1901); Schreiber: 9 (1967); Obermeyer & Faden: 50 (1985).

Perennial or (rarely) annual succulent herbs; perennials commonly with storage organs such as bulbs, corms, rhizomes or tubers, often with separate fertile and sterile shoots; roots many, thin or stout, sometimes tuberous. **Leaves** succulent, spirally arranged or distichous, sessile. **Inflorescences** terminal, or terminal and axillary, or all axillary cymes, each cyme subtended by a spathaceous, leaf-like bract and usually with large, herbaceous, persistent bracteoles; flowers 2-ranked, sessile or subsessile. **Flowers** bisexual, regular, small, open for a few hours only, in the morning. **Sepals** tubular below, usually with hairy lobes, persistent. **Petals** united into short tube, 3 lobes erect or spreading, acute to obtuse, blue, purple or pink. **Stamens** 6, equal, erect, white or coloured like corolla or darker; filaments filiform, or sometimes fusiform in upper half, long, patent, beaded hairs always present in upper half; anthers yellow, basifixed, locules opening from a basal aperture, then splitting open to apex. **Ovary** ovoid, 3-locular, hairy above; ovules 2 in each locule, superposed; style thin, filiform or in some species fusiform below small apical stigma, glabrous or bearded. **Fruit** a capsule, narrowly ovoid, erect. **Seeds** oblong-globose, obtuse; testa greyish brown, wrinkled or pitted, epidermis minutely pellucid-dotted; embryotega at apex of upper seed, and at base of lower seed. $x = 12$ (10, 11, 13, 17).

Species ± 50, warm regions of Africa, Asia and N Australia; 7 in sthn Afr., N Namibia and Botswana, northern provinces of South Africa, Free State, Swaziland, KwaZulu-Natal and Eastern Cape, absent in Northern and Western Cape except in the far east.

Floscopa Lour. 0908000

Loureiro: 189, 192 (1790); Clarke: 14 (1897); Schreiber: 11 (1967); Brenan: 26 (1968); Obermeyer & Faden: 56 (1985).

Perennial or annual hygrophytic herbs; stems erect or ascending, rooting from lower nodes or with a basal root-crown. **Leaves** spirally arranged, mostly linear to oblong, acute, sheathing at base. **Inflorescence** terminal, lax to dense, often a leafy compound thyrse, glandular-pubescent or glabrous; bracteoles small or lacking; pedicels short. **Flowers** bisexual, small. **Sepals** free, equal, persistent. **Petals** free, equal or lower one narrower, blue, mauve, pink or yellow, deliquescent. **Stamens** 5 or 6, equal or upper 3 slightly different from lower 3; upper 3 fused basally; filaments glabrous. **Ovary** 2-celled, 1 ovule in each locule, glabrous. **Fruit** a 2-valved capsule, shortly stipitate, dorsiventrally compressed, ellipsoidal-obovoid, apex retuse or acute. **Seeds** depressed-hemispherical, ribbed or smooth, occasionally covered by small glandular discs; hilum linear; embryotega dorsal. $x = 6$ (8, 11).

Species ± 20, widespread in warmer regions of Africa, Asia, Australia, Central and South America; 3 in sthn Afr., Namibia (Caprivi), N Botswana, northern provinces of South Africa, Swaziland and KwaZulu-Natal.

Murdannia Royle 0899010

Royle: 403, t. 95, fig. 3 (1839); Brenan: 179 (1952); Schreiber: 11 (1967); Obermeyer & Faden: 47 (1985).

Annual or perennial herbs; roots various. **Leaves** spirally arranged or distichous, blade sessile. **Inflorescence** terminal, or terminal and axillary thyrses or axillary fascicles; bracteoles persistent or soon falling. **Flowers** bisexual and male, regular or slightly irregular; pedicellate. **Sepals** free, ± equal, sepaline. **Petals** free, not clawed, blue, purple or white (rarely yellow). **Stamens** 2 or 3, fertile, antesepalous, sometimes one staminodal; filaments bearded or glabrous. **Staminodes** (0–)3(4), antepetalous (when 4, one antesepalous), filaments bearded or glabrous. **Ovary** 3-locular; ovules one to many per locule. **Fruit** a 3-valved capsule, 3-locular. **Seeds** uniseriate or biseriate; hilum punctiform to linear; embryotega lateral to dorsal. $x = 10$ (6, 8).

Species ± 50, pantropical and warm temperate, with greatest diversity in tropical Asia; 1 in sthn Afr.: *Murdannia simplex* (Vahl) Brenan, Namibia (Caprivi), N Botswana, Mpumalanga, Swaziland and KwaZulu-Natal.

*Tradescantia L. 0911000

Linnaeus: 288 (1753); Brückner: 166 (1930); Obermeyer & Faden: 59 (1985).

Perennial herbs; stems simple to diffusely branched, erect or trailing, sometimes rooting at nodes. **Leaves** distichous, oblong-ovate to linear. **Inflorescence** terminal and/or axillary, of paired, sessile cymes, each pair subtended by leaf-like or spathe-like bracts. **Flowers** bisexual, regular, pedicellate, few to many. **Sepals** free, green or coloured. **Petals** free, obovate to orbicular, white. **Stamens** 6, equal; filaments bearded. **Ovary** 3-

celled, with (1)2 superposed ovules in each cell. **Fruit** a loculicidal capsule. **Seeds** variable; hilum linear to punctate; embryotega dorsal. $x = 6$ (7, 8, 10, 11, 13, 19, 23, 37) (aneuploids, very high polyploidy).

Species ± 60, North and South America; several in cultivation; 1 naturalised in sthn Afr.: **Tradescantia fluminensis* Vell., Mpumalanga and KwaZulu-Natal.

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Cymodoceaceae

(Alismatidae—Najadales)

Compiled by R.P. Glen

Submerged, dioecious, perennial marine plants. **Rhizomes** creeping, either herbaceous, monopodial and rooting at nodes or ligneous, sympodial and rooting from internodes. **Leaves** alternate, distichous, or apparently opposite, scale-like on rhizomes, ribbon-like on branches, with 3–several parallel or pseudoparallel nerves, with an open basal sheath and ligule at its junction with the blade, truncate or emarginate at apex; sheath perhaps stipular. **Flowers** unisexual, small, solitary, terminal on short side branches; water-pollinated; sepals and petals 0. **Male flowers** subsessile or stalked, consisting of two 2-thecous, longitudinally dehiscent anthers, paired on a common filament; connectives usually prolonged; pollen grains often released in water, becoming filamentous. **Female flowers** sessile or stalked, each consisting of 2 mutually free carpels; style either long (*Halodule*) or short, simple or divided into 2–4 strap-shaped stigmata; ovule solitary, pendulous, orthotropous, bitegmic. **Fruit** indehiscent, either with stony endocarp (*Halodule*) or viviparous (*Thalassodendron*). **Seeds** pendulous; endosperm 0.

Genera 5, species 16, distributed in the tropical seas, some extending into subtropical and warm temperate waters. The genus *Amphibolis* is limited to the Australian temperate waters; sthn Afr.: genera 2, species 2, along the eastern coast.

Obermeyer: 73 (1966) under Zannichelliaceae; Den Hartog: 144 (1970); Dahlgren *et al.*: 320 (1985); Cook: 63 (1990).

Key to genera

Rhizomes ligneous, sympodial and rooting from the internodes; leaves coriaceous, about 10 mm broad, falcate; styles with 2–4 stigmatic arms; anthers attached at equal heights ..... **Thalassodendron**

Rhizome herbaceous, monopodial and rooting at the nodes; leaves grass-like, linear to setaceous; style simple, attached laterally to the globose carpel; one anther situated above the other ..... **Halodule**

Halodule Endl. 0061000

Endlicher: 1368 (1841); Obermeyer: 76 (1966); Den Hartog: 146 (1970); Cook: 66 (1990).

Perennial, slender, grass-like, dioecious, marine herbs, with a creeping rhizome, rooting at nodes. **Leaves** distichous, 2–4 per shoot, linear to setaceous, straight, flat, dark green, midrib and margins ending in short apical teeth; stipular sheath long, attached to lamina, convolute, flat, forming 2 rounded auricles above; ligule a narrow apical ridge. **Flowers** solitary, on short side branches, surrounded by membranous leaf sheaths. **Male flowers** consisting of a double fused stamen, with 2-locular, sometimes apiculate anthers arising at different heights and facing in opposite directions, attached dorsally to filament, occasionally with 3 small protuberances arising at different heights on connective; pollen confervoid. **Female flowers** consisting of 2 collateral carpels on a short, clavate, verrucose peduncle; style long, subulate; ovule solitary, pendulous. **Fruit** a globose, hard drupelet. $x = 1$ (polyploidy).

Species 7, fairly widespread under tropical marine conditions; 1 in sthn Afr.: *Halodule uninervis* (Forssk.) Aschers., northern coast of KwaZulu-Natal.

Thalassodendron Hartog 0060010

Den Hartog: 186 (1970); Bennett: 228 (1901); Cook: 66 (1990).

Cymodocea K.Koenig: 96 (1805); Den Hartog: 187 (1970); Obermeyer: 73 (1966).

Submerged marine, dioecious perennials with long, woody, creeping, jointed sympodial rhizomes, bearing an erect leafy stem at each 4th internode. **Roots** emerging from preceding 3rd internode. **Stems** erect, usually unbranched with prominent circular leaf scars. **Leaves** 6–10 per stem, in distichous apical tufts, early deciduous, leaf sheath folded, open, shed together with linear blade. **Flowers** solitary on short side branches, enclosed

by 4 leaf-like bracts. **Male flower** with 2 fused apiculate stamens, becoming detached at anthesis, anther thecae dehiscing and pollen released in 8 pendulous filamentous bundles. **Female flower** consisting of 2 carpels, with the 2 short styles each divided into 2 long, subulate, stigmatic lobes. **Fruit** with 1 or 2 carpels developing, surrounded by inner fleshy bract; often viviparous; seedling free-floating.

Species 2, coasts of E Africa, E Malaysia, and W Australia; *Thalassodendron ciliatum* (Forssk.) Hartog, widespread in western Indian Ocean and recorded from the east coast of Africa as far south as Kosi Bay, N KwaZulu-Natal.

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Cyperaceae

(Commelinidae—Cyperales)

Compiled by C. Archer

Perennial, sometimes annual, grass-like, often rhizomatous herbs, sometimes bearing corms or tubers, sometimes monoecious or with bisexual and unisexual florets together; usually associated with wet or damp conditions. **Culms** (stems) 3-angled, less often cylindric, solid, sometimes hollow, nodose or nodes only ± basal and concealed by leaves, generally unbranched below inflorescence, erect or decumbent, rarely prostrate, sometimes rooting. **Leaves** alternate, often 3-ranked, mostly crowded in a basal tuft, consisting of a closed, rarely split sheath, a long, narrow blade (sometimes filiform, setaceous or 0) and often a ligule at junction of sheath and blade. **Inflorescence** terminal, capitate, paniculate, or anthelate (compact corymb-like inflorescence; the most common type especially in tribe Cypereae), of a single spikelet (rarely), or several to many spikelets; subtending bracts usually foliose, sometimes scale-like. **Spikelets** bearing 1–many, usually bisexual, sometimes unisexual florets within distichous to spirally arranged imbricate glumes (in *Schoenoxiphium* and *Carex* female spikelet solitary, partially or wholly enclosed by sac-like perigynium). **Perianth** of 3–6 or more scales or bristles, or 0. **Stamens** (1–)3, rarely more; anthers frequently basally appendaged and with a distal, usually barbate apiculus. **Ovary** superior, 1-locular, with single basal ovule; style 1, sometimes thickened at base, simple or 2- or 3(or more)-branched, persistent, or sometimes deciduous above or below swelling. **Fruit** an indehiscent nutlet or achene.

Genera ± 104, species ± 5 000, cosmopolitan; mostly in moist areas; sthn Afr.: genera 40, species ± 400.

Pax: 98 (1887); Clarke: 149 (1897), 193 (1898), 758 (1900); Schonland: 1 (1922); Levyns: 97 (1950); Podlech: 1 (1967); Gordon-Gray: 99 (1972); Compton: 58 (1976); Bond & Goldblatt: 38 (1984); Forbes: 29 (1987); Gordon-Gray: 1 (1995); Goetghebeur (1998).

The family is divided into subfamilies and tribes, based mainly on inflorescence and floret structure. The interpretation of this structure, and the resulting classification, varies from author to author. A recent classification is that of Bruhl (1995). It is based on many lines of evidence, i.e. traditional morphological as well as embryological, anatomical and physiological data. Muasya *et al.* (1998) suggested changes to Bruhl's classification, based on evidence from *rbc*L DNA sequences. The classification presented here is by no means fully resolved:

Classification of Cyperaceae

I. Subfamily CYPEROIDEAE
   1. Tribe **Cypereae**: *Alinula*, *Ascolepis*, *Courtoisina*, *Cyperus* (including *Mariscus*), *Kyllinga*, *Kyllingiella*, *Lipocarpha* (including *Hemicarpha*, *Rikliella*), *Oxycaryum*, *Pycreus*, *Volkiella*
   2. Tribe **Scirpeae**: *Bolboschoenus*, *Eleocharis*, *Ficinia*, *Fuirena*, *Hellmuthia*, *Isolepis* (including *Eleogiton*), *Pseudoschoenus*, *Schoenoplectus*, *Scirpoides*, *Scirpus*, *Websteria*
   3. Tribe **Abildgaardieae**: *Abildgaardia*, *Bulbostylis*, *Fimbristylis*

II. Subfamily CARICOIDEAE
   1. Tribe **Rhynchosporeae**: *Rhynchospora*
   2. Tribe **Schoeneae**: *Capeobolus, Carpha*, *Cladium*, *Costularia*, *Cyathocoma*, *Epischoenus*, *Neesenbeckia*, *Schoenus*, *Tetraria*, *Trianoptiles*
   3. Tribe **Trilepideae**: *Coleochloa*
   4. Tribe **Cariceae**: *Carex*, *Schoenoxiphium*
   5. Tribe **Sclerieae**: *Scleria*
   6. Tribe **Hypolytreae**: *Chrysitrix*

A specimen of *Eriophorum angustifolium* Koch, *McLea* in *BOL6024* (BOL!, K!) (0466000), is labelled 'from Transvaal' but the provenance is doubtful.

The following key attempts, as far as possible, to reflect this classification, but it must be appreciated that many of the important classificatory characters are of little use in a key, which is of necessity based on easily observed morphological characters. Additionally, because spikelet bracts often grade into glumes or are difficult to distinguish from one another, the following wording is used in the key in order to reduce confusion: 'glumes and/or spikelet bracts'.

Key to groups and genera

1a Florets all unisexual or functionally unisexual; spikelets unisexual or bisexual; some empty glumes and/or spikelet bracts present ..... **Group 6**
1b Florets all bisexual, or bisexual and unisexual or functionally unisexual together; spikelets, at least aerial ones, bisexual; some empty glumes and/or spikelet bracts occasionally present:
2a Spikelets composed of 1 bisexual floret, with 0–1 empty glumes and/or spikelet bracts at base ..... **Group 1**
2b Spikelets composed of (1–)several bisexual florets, or of bisexual and unisexual florets together, with several empty glumes and/or spikelet bracts at base:
3a Glumes distichous:
4a Spikelets with 0–2 empty glumes and/or bracts at base; nutlets not accompanied by bristles ..... **Group 2**
4b Spikelets with 3 or more empty glumes and/or bracts at base; nutlets sometimes accompanied by bristles ..... **Group 4**
3b Glumes subdistichous to spirally arranged:
5a Spikelets with 0–2 empty glumes and/or bracts at base:
6a Stamens 1–3 ..... **Group 3**
6b Stamens 6 ..... **Cyathocoma**
5b Spikelets with 3 or more empty glumes and/or bracts at base ..... **Group 5**

Group 1: *Spikelets composed of 1 bisexual floret.*

1a Plants aquatic; inflorescence diffuse, comprising many, mostly sterile compoundly whorled branches; spikelets single on ends of fertile branches ..... **Websteria**
1b Plants terrestrial; inflorescence capitate, digitate, or anthelate to compound-anthelate:
2a Glumes adaxially connate, dorsiventrally compressed or trumpet-shaped ..... **Ascolepis**
2b Glumes not adaxially connate:
3a Spikelet bracts much larger than spikelet; glumes reduced, hyaline:
4a Culms at least 50(–450) mm high; spikelets spirally arranged, prophyll hyaline ..... **Lipocarpha**
4b Culms 0 or very short; spikelets subdistichous, prophyll thick-textured ..... **Volkiella**
3b Spikelet bracts smaller than spikelet; glumes well developed ..... **Alinula**

Group 2: *Spikelets composed of (1–)several bisexual florets; glumes distichous.*

1a Stigmas 3 (sometimes very short or 0), or if 2, nutlet dorsiventrally compressed:
2a Annuals with fenugreek odour when dried:
3a Inflorescences squarrose; keels of glumes not winged, excurrent into awn at least a quarter the length of glume body ..... **Cyperus** subgen. **Aristomariscus**
3b Inflorescences not squarrose; keels of glumes winged, hardly excurrent ..... **Courtoisina**
2b Perennials (occasionally annual) without fenugreek odour when dried ..... **Cyperus**
1b Stigmas 2; nutlet laterally compressed:
4a Inflorescence digitate or anthelate to compound-anthelate; florets many (more than 5) ..... **Pycreus**
4b Inflorescence capitate (occasionally with accessory capitula); florets 1 or 2(–5) ..... **Kyllinga**

Group 3: *Spikelets composed of several to many bisexual florets; glumes subdistichous to spirally arranged; stamens 1–3.*

1a Style base enlarged:
2a Inflorescence a single spikelet (occasionally with accessory spikelets); inflorescence bracts scale-like; style base persisting ..... **Eleocharis**
2b Inflorescence seldom a single spikelet, or if so, then inflorescence bracts not scale-like and style base not persisting:
3a Mouth of leaf sheath glabrous; style base not persisting on nutlet:
4a Inflorescence of 1–4 large spikelets longer than 8 mm; stigmas 3; nutlet obpyriform, epidermal cells isodiametric.. ..... **Abildgaardia**
4b Inflorescence of more than 10 small spikelets shorter than 5 mm, or if longer than 8 mm, then stigmas 2; nutlet obovoid (occasionally obpyriform), epidermal cells mostly horizontally elongated ..... **Fimbristylis**
3b Mouth of leaf sheath pilose; style base persisting as a button-like structure on nutlet ..... **Bulbostylis**
1b Style base not enlarged:
5a Nutlet borne on gynophore:
6a Ligule usually well developed, papyraceous ..... **Ficinia**
6b Ligule not well developed:
7a Plants annual ..... **Isolepis marginata**
7b Plants perennial:
8a Leaf blades well developed; plants occurring in high-altitude grassland in summer-rainfall region..... ..... **Scirpus falsus, S. ficinioides**
8b Leaf blades reduced to sheaths (sometimes a very short blade developed); plants occurring along coast (occasionally inland) from KwaZulu-Natal to Northern Cape ..... **Scirpoides (Ficinia) nodosus**
5b Nutlet not borne on gynophore:
9a Culms nodose (i.e. nodes aerial, spaced ± equally along culm), leaf-bearing, usually markedly 3(–5)-angled:

10a Inflorescence anthelate to compound-anthelate, occasionally capitate or reduced to a single spikelet but, if so, with at least 2 leaf-like involucral bracts ..... **Bolboschoenus**
10b Inflorescence paniculate or occasionally capitate but, if so, with only 1 involucral bract ..... **Fuirena**
9b Culms appearing nodeless (i.e. nodes ± basal, concealed by leaves):
11a Leaf blades well developed:
12a Floating aquatic plants; inflorescence anthelate, ultimate units capitate; nutlet long-beaked, with corky flotation tissue at base ..... **Oxycaryum**
12b Terrestrial plants, if aquatic then rooted in substrate and inflorescence a single spikelet or capitate/digitate; nutlet beakless or shortly beaked without flotation tissue:
13a Inflorescence white, capitate, 5–7 mm in diameter; involucral bracts (2)3 ..... **Kyllingiella**
13b Inflorescence not as above:
14a Hard, perennial plants occurring in grassland or denuded areas ..... **Scirpus**
14b Soft, annual or perennial plants, if perennial then occurring in aquatic or marshland habitats ..... **Isolepis**
11b Leaf blades reduced to sheaths (sometimes a very short blade developed):
15a Inflorescence pseudolateral with subtending bract appearing as continuation of culm:
16a Glumes generally mucronate or, if inflorescence digitate and glumes rounded, then inflorescence bract more than half (–3 ×) length of culm ..... **Schoenoplectus**
16b Glumes generally rounded at apex and inflorescence digitate or, if inflorescence of several stalked, rounded clusters of spikelets, and glumes mucronate, then inflorescence bract in both cases less than $^{1}/_{40}$ length of culm ..... **Scirpoides**
15b Inflorescence terminal:
17a Inflorescence paniculate, of many spikelets ..... **Pseudoschoenus**
17b Inflorescence capitate, of (1–)several spikelets:
18a Dwarf annuals or slender perennials up to 200 mm tall (usually less); spikelets less than 3 mm in diameter ..... **Isolepis**
18b Densely tufted robust perennials 400–800 mm tall; spikelets ± 7 mm in diameter ..... **Hellmuthia**

Group 4: *Glumes distichous; spikelets with 3 or more empty glumes and/or bracts at base.*

1a Spikelets with bristles:
2a Spikelets of 2 kinds: subterranean female (without bristles) and aerial bisexual; bristles 3, complex ..... **Trianoptiles**
2b Spikelets all aerial, bisexual; bristles 6, simple ..... **Carpha**
1b Spikelets without bristles, or if present, minute:
3a Rachilla of spikelet between bisexual florets elongated, thickened and curved ..... **Schoenus**
3b Rachilla of spikelet elongated and sometimes curved above uppermost bisexual floret ..... **Epischoenus**

Group 5: *Glumes subdistichous to spirally arranged; spikelets with 3 or more empty glumes and/or bracts at base.*

1a Stigmas 2 ..... **Rhynchospora**
1b Stigmas 3 or more:
2a Leaves mostly reduced to sheaths, uppermost leaf lamina cylindrical and similar to culms ..... **Neesenbeckia**
2b Leaves not as above:
4a Nutlet long-clawed:
5a Inflorescence a large panicle of many spikelets; glumes chestnut brown ..... **Costularia**
5b Inflorescence a reduced panicle of 6 (or fewer) spikelets; glumes green to yellow-green, drying light brown ..... **Capeobolus**
4b Nutlet sessile or shortly clawed:
6a Large robust plants; culm nodose, rounded and hollow; inflorescence a panicle ..... **Cladium**
6b Plants variable in height and robustness; culm variable, if nodose then triangular in cross section and solid; inflorescence variable ..... **Tetraria**

Group 6: *Spikelets bisexual or unisexual (or functionally unisexual); florets all unisexual.*

1a Plants functionally dioecious, rush-like; inflorescence capitate, pseudolateral (subtending bract appearing as a continuation of culm) ..... **Scirpoides dioecus**
1b Plants neither dioecious nor rush-like:
2a Spikelet solitary, pseudolateral, composed of many male florets and one terminal female floret ..... **Chrysitrix**
2b Spikelet not as above:
3a Female spikelet not enclosed by a perigynium (modified bract):
4a Hard grass-like plants inhabiting rock outcrops; leaf sheaths split to base, blades abscising at apex of sheath, ligule a hairy ring; inflorescence a slender panicle; nutlet with loosely attached pericarp resembling perigynium; bristles present ..... **Coleochloa**
4b Not as above:
5a Bisexual, male and female spikelets clustered together; nutlet borne on a stalk (gynophore) ..... **Scleria**
5b Male spikelets borne at upper nodes of inflorescence, female spikelets borne at lower nodes; nutlet not borne on a stalk (gynophore) ..... **Tetraria crinifolia**
3b Female spikelet partially or wholly enclosed by perigynium:

6a Perigynium entire or split unevenly in one or two places; rachilla present, usually bearing male florets, which are exserted from perigynium ..... **Schoenoxiphium**

6b Perigynium entire, bottle-shaped, frequently apex rostrate, 2-toothed; rudimentary rachilla occasionally present within perigynium ..... **Carex**

Abildgaardia Vahl 0471020

Vahl: 296 (1805); Kunth: 247 (1837); Lye: 539 (1971b); Gordon-Gray: 19 (1995).

Fimbristylis L. section *Abildgaardia* (Vahl) Benth.: Clarke: 200 (1898). *Fimbristylis* L. in part; Schonland: 33 (1922); Gordon-Gray: 549 (1971); Gordon-Gray: 110 (1972); Compton: 71 (1976); Forbes: 47 (1987).

Perennials, tufted. **Culms** with basal nodes. **Leaves** basal, eligulate; sheath with adaxial apex truncate, glabrous; blade linear, sometimes very short or 0, without keeled midrib, profile thickly crescentiform. **Inflorescence** a single spikelet, or capitate, or a simple anthela; subtending bracts foliose or scale-like. **Spikelets** of several subdistichous to spirally arranged glumes, basal few empty, up to 20 fertile, bisexual, upper few male or empty. **Perianth** 0. **Stamens** 3. **Style** 3-branched. **Nutlet** obovate, triangular, smooth, warty or rugose.

Species ± 10, Africa, Asia and Australia; ± 3 in sthn Afr., in Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho and Eastern Cape.

The problem of the interrelationship between the generic concepts of *Fimbristylis*, *Abildgaardia* and *Bulbostylis* is discussed by Lye: 539 (1971b) and Gordon-Gray: 549 (1971) respectively. Lye took positive action by making transfers from *Bulbostylis* to *Abildgaardia*, whereas Gordon-Gray expressed reservations. Gordon-Gray (1995) has accepted the genus as here defined. Recently Lye (1995) has again accepted the genus *Bulbostylis*; the differences between *Abildgaardia* and *Bulbostylis* are summarised by Lye (1996).

Alinula J.Raynal 0459050

Raynal: 43 (1977a); Goetghebeur & Vorster: 457 (1988).

Aliniella J.Raynal: 157 (1973), not of Skvortzov. *Cyperus* L. subgen. *Mariscus* (Vahl) C.B.Clarke in part; Kükenthal: 402 (1936). *Cyperus* L. subgen. *Fimbricyperus* Lye: 60 (1981).

Small annuals, strong-smelling when dry (fenugreek odour—Goetghebeur 1986). **Culms** slender, with basal nodes. **Leaves** few, basal, eligulate; sheath with adaxial apex truncate; blade linear, short, with or without keeled midrib, profile V-shaped or thinly crescentiform. **Inflorescence** bisanthelate; subtending bracts erect, leaf-like. **Spikes** ± ovate, 2–4 mm long; spikelet bracts many, dense, spirally arranged. **Spikelets** 1-flowered; floret bisexual, fertile; rachilla present. **Perianth** 0. **Stamens** 2. **Style** 3-branched. **Nutlet** narrowly ellipsoid, straight or curved, 3-angled, papillose.

Species 4, Africa and Madagascar; 1 in sthn Afr.: *Alinula paradoxa* (Cherm.) Goetgh. & Vorster; rare in Namibia, Northern Province, Mpumalanga and N KwaZulu-Natal.

Ascolepis Nees ex Steud. 0454000

Steudel: 105 (1854) name conserved; Clarke: 266 (1898); Clarke: 473 (1902); Schonland: 54 (1922); Podlech: 3 (1967); Gordon-Gray: 103 (1972); Compton: 60 (1976); Goetghebeur: 269 (1980); Forbes: 37 (1987); Gordon-Gray: 23 (1995).

Platylepis Kunth: 269 (1837), not of A.Rich.

Tiny annuals or medium-sized sparsely tufted perennials. **Culms** erect, with basal nodes. **Leaves** basal, eligulate; sheath with adaxial apex truncate; blade with or without keeled midrib, profile V-shaped or crescentiform. **Inflorescence** capitate, of 1–5 spikes; subtending bracts 2(3), often expanded basally, blade setaceous, often recurved. **Spikes** ± hemispherical; spikelet bracts several, hyaline, densely spirally imbricate, 2 lowest and frequently uppermost empty. **Spikelets** with glumes longer than spikelet bracts, dorsiventrally compressed and connate at margins with adaxial 2-cleft valve, or trumpet-shaped, enclosing floret and rachilla when present, awned; florets mostly bisexual, uppermost frequently male. **Perianth** 0. **Stamens** 2 or 3. **Style** branches 2 or 3. **Nutlet** narrowly obovate, lenticular or subtrigonous, papillose.

Species ± 20, ± cosmopolitan in warm climates; 2 in sthn Afr.: annual *Ascolepis pusilla* Ridley in Namibia and perennial *A. capensis* (Kunth) Ridley in marshes in Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho and Eastern Cape.

Bolboschoenus (Asch.) Palla 0468030

Palla: 2531 (1905); Browning & Gordon-Gray: 380 (1992); Gordon-Gray: 25 (1995).

Scirpus L. in part; Thunberg: 17 (1794); Schrader: 29 (1832); Kunth: 157 (1837); Clarke: 210 (1898); Clarke: 446 (1902); Podlech: 44 (1967); Gordon-Gray: 109 (1972); Forbes: 59 (1987).

Perennials, rhizomatous. **Culms** sharply 3-angled, nodose; bases swollen. **Leaves** eligulate; sheath closed, adaxial apex n-shaped to truncate; blade short below to well developed above, linear, flat, with keeled midrib, profile V-shaped, keel and margins scabrid. **Inflorescence** capitate to bisanthelate; subtending bracts erect. **Spikelets** few to many, many-flowered; glumes spirally arranged. **Perianth** (0–)6, when present, of bristles. **Stamens** 3, crested. **Style** linear, base persistent, branches 3. **Nutlet** obovate, biconvex or 3-angled, smooth. $x = 13$ (aneuploids, polyploidy).

Species ± 11, widespread in Old and New World; 3 in sthn Afr., mainly along the coasts of N KwaZulu-Natal, Western and Eastern Cape, and sporadically at low altitudes inland.

Bulbostylis Kunth 0471010

Kunth: 205 (1837) name conserved; Clarke: 204 (1898); Clarke: 427 (1902); Schonland: 35 (1922); Podlech: 4 (1967); Gordon-Gray: 549 (1971); Gordon-Gray: 110 (1972); Compton: 72 (1976); Bond & Goldblatt: 38 (1984); Forbes: 35 (1987); Gordon-Gray: 25 (1995).

Annuals or perennials, mainly tufted. **Culms** with basal nodes. **Leaves** basal, ligulate or eligulate, slender, often pubescent; sheath with adaxial apex truncate, usually ciliate; blade usually setaceous, sometimes linear, flat, often very short or 0, without keeled midrib, profile thickly crescentiform. **Inflorescence** a single spikelet or capitate, or a simple or compound anthela. **Spikelets** of many spirally imbricate glumes, lowest 1 or 2 glumes empty, many above fertile, bisexual, uppermost with male florets or empty, nearly always pubescent on the back. **Perianth** 0. **Stamens** 2 or 3. **Style** linear, with swollen base, (2)3-branched, deciduous, leaving enlarged base as a small button on nut. **Nutlet** obovoid, 3-angled, trabeculate, rugose, warty, papillose or smooth. $x = 5$ (polyploidy).

Species ± 100, mainly tropical Africa and tropical America; ± 15 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho, Northern and Eastern Cape with 1 reaching the Cape Peninsula.

Capeobolus Browning 0482010

Browning & Gordon-Gray: 218 (1999).

Costularia C.B.Clarke in part; Clarke: 274 (1898). *Tetraria* P.Beauv. in part; Levyns: 121 (1950).

Perennial, tufted. **Culms** cryptic. **Leaves** mostly basal, few cauline, equitant, pseudopetiolate, eligulate; blade flat, bifacial, lacking midrib. **Inflorescence** reduced, paniculate. **Spikelets** solitary, sessile or shortly pedun-

cled, of 7–10 distichous glumes, proximal sterile, distal 2 fertile, the lower functionally male, uppermost bisexual. **Perianth** 3 + 3 villous outgrowths shorter than nutlet. **Stamens** 3. **Style** linear, 3-branched; base persistent as cap on fruit, pubescent. **Nutlet** elliptic or oblong, surface longitudinally 3-ridged, faintly transversely rugose distally.

Species 1: *Capeobolus brevicaulis* (C.B.Clarke) Browning; southern mountains of Western Cape, reaching Humansdorp District of Eastern Cape.

Carex L. 0525000

Linnaeus: 972 (1753); Thunberg: 14 (1794); Kunth: 368 (1837); Clarke: 299 (1898); Clarke: 514 (1902); Kükenthal: 67 (1909); Schonland: 68 (1922); Levyns: 130 (1950); Gordon-Gray: 112 (1972); Compton: 75 (1976); Bond & Goldblatt: 38 (1984); Forbes: 38 (1987); Gordon-Gray: 36 (1995).

Monoecious perennials, tufted or long-rhizomatous. **Culms** with aerial or basal nodes. **Leaves** basal only, or basal and cauline, ligulate; sheath with adaxial apex truncate to U- or V-shaped; blade usually linear, flat, with or without keeled midrib, profile V-shaped, flanged V-shaped or crescentiform. **Inflorescence** spicate, glomerate-spicate to glomerate-paniculate, paniculate, or a raceme of spikes. **Spikelets** unisexual, 1-flowered, solitary in axils of glume-like bracts; male spikelet naked, female spikelet, sometimes together with vestigial rachilla, surrounded by modified prophyll (perigynium); perigynium almost closed, apex usually 2-toothed. **Perianth** 0. **Stamens** 3. **Style** 2- or 3-branched. **Nutlet** ellipsoid to obovate, biconvex or 3-angled, beaked, papillose, remaining within perigynium at dispersal. $x = 10$ (6, 7, 8, 9, 11, 13) (high aneuploids, high polyploidy).

Species ± 2 000, ± cosmopolitan in moist temperate climates and extending into arctic and antarctic regions; ± 14 species in sthn Afr.; occurring in Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape, with 1 in Namibia and Botswana (not recorded in Podlech 1967) and 1 endemic to Lesotho.

Carpha R.Br. 0480010

Brown: 230 (1810); Clarke: 269 (1898); Clarke: 483 (1902); Kükenthal: 101 (1939c); Kükenthal: 209 (1939d) including *Trianoptiles* Fenzl; Schonland: 55 (1922); Gordon-Gray: 103 (1972); Bond & Goldblatt: 38 (1984); Gordon-Gray: 43 (1995).

Asterochaete Nees: 300 (1835); Kunth: 311 (1837); Levyns: 119 (1950). *Schoenus* L. in part; Thunberg: 17 (1794).

Perennials, tufted or rhizomatous, sometimes robust. **Culms** usually nodose and leafy. **Leaves** basal and cauline, eligulate; sheath with adaxial apex truncate to U-shaped; blade with or without keeled midrib, profile V-shaped or crescentiform. **Inflorescence** a large or reduced panicle. **Spikelets** short, of 4–7 spirally arranged glumes; 2 or 3 lowest glumes empty, next 1 or 2 with bisexual, fertile florets, uppermost floret male or empty. **Perianth** of 6 bristles, shorter than, to slightly longer than nutlet. **Stamens** 3. **Style** elongate; branches 3, elongate. **Nutlet** ellipsoid, 3-angled, papillate, ± beaked and hispid.

Species ± 15, southern hemisphere; ± 5 in sthn Afr., occurring in Northern Province, Mpumalanga, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

Chrysitrix L. 0500000

Linnaeus: 165 (1771); Kunth: 365 (1837); Clarke: 292 (1898); Clarke: 760 (1900); Schonland: 63 (1922); Levyns: 129 (1950); Bond & Goldblatt: 38 (1984).

Perennials, tufted, sometimes long-rhizomatous. **Culms** flattened, with basal nodes. **Leaves** basal, eligulate, distichous; sheath split; blade: lower 0, upper well developed, similar to flowering stems; unifacial, profile circular to elliptical. **Inflorescence** pseudolateral, of a single spike; lowest bract appearing as a continuation of culm. **Spike** of many spirally imbricate bracts, lowest empty, next 11–100(?) with male florets, with a single, female floret at apex. **Perianth** 0. **Stamen** 1; anther crested. **Style** 3–7-branched (Bruhl 1995: 2 or 6). **Nutlet** pale, ovoid to subglobose, longitudinally closely striate.

Species ± 4, 1 in Australia; ± 3 in Western Cape. Sometimes spelled *Chrysithrix*.

Cladium P.Browne 0489000

Browne: 114 (1756); Kunth: 303 (1837); Clarke: 291 (1898); Clarke: 484 (1902); Schonland: 62 (1922); Podlech: 6 (1967); Gordon-Gray: 111 (1972); Bond & Goldblatt: 38 (1984); Gordon-Gray: 44 (1995).

Robust perennials up to 3 m tall, tufted, sometimes stoloniferous. **Culms** with aerial nodes. **Leaves** basal, up to 1.25 m long, eligulate; sheath with adaxial apex V-shaped; blade well developed, sometimes reduced and bract-like at nodes, with keeled midrib, profile V-shaped, margin and keel scabrid. **Inflorescence** a panicle ± 0.7 m long. **Spikelets** of 4–11 spirally imbricate glumes, lowest 3 or 4 empty. **Perianth** 0. **Stamens** 2. **Style** thickened at base, 3-branched. **Nutlet** brown, ovate, 3-angled, smooth, crowned with style base and continuous with it. $x = 6, 10$.

Species ± 4, ± cosmopolitan in warm areas but largely Australia; 1 subsp. in sthn Afr.: *Cladium mariscus* (L.) Pohl subsp. *jamaicense* (Crantz) Kük., occurring in Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga and the coasts of KwaZulu-Natal, Western and Eastern Cape.

Coleochloa Gilly 0512000

Gilly: 12 (1943); Nelmes: 374 (1954); Compton: 73 (1976); Forbes: 39 (1987).

Eriospora Hochst. ex A.Rich: 508 (1851) not of Berk. & Broome; Clarke: 297 (1898); Clarke: 511 (1902); Schonland: 65 (1922).

Perennials, tufted. **Culms** rounded to compressed below, with aerial nodes. **Leaves** basal and cauline, ligulate, distichous, deciduous, slender; sheaths split or tubular (cauline leaves), apex V-shaped; blade setaceous, without keeled midrib; profile V-shaped or crescentiform. **Inflorescence** paniculate. **Spikelets** of several, obscurely distichous glumes, mostly bearing florets of both sexes separately; lowest 1 or 2 glumes empty, next with female floret and uppermost 1 or 2 with male florets or empty. **Perianth** of 3 plumose scales. **Stamens** (1)3. **Style** linear, 3-angled and broadened into a hollow beak (formed by separation of pericarp) on ovary, 3-branched. **Nutlet** pale, green or brown, ovoid, triangular, beaked.

Species ± 7, Africa and Madagascar; 2 in sthn Afr., occurring in Northern Province, North-West, Gauteng, Mpumalanga, KwaZulu-Natal and Swaziland.

Costularia C.B.Clarke 0482000

Clarke: 274 (1898); Schonland: 58 (1922); Kükenthal: 13 (1939a); Kükenthal: 65 (1939b); Gordon-Gray: 111 (1972); Compton: 72 (1976); Bond & Goldblatt: 39 (1984); Browning: 653 (1994).

Tetraria P.Beauv. in part; Gordon-Gray: 187 (1995).

Small to robust tufted perennial herbs. **Culms** erect, with aerial nodes. **Leaves** basal and cauline, eligulate; sheath with adaxial apex truncate to V-shaped; blade linear, without keeled midrib, profile ± flat to crescentiform. **Inflorescence** an oblong, compressed panicle of many spikelets (inflorescence highly reduced with few spikelets in *C. brevicaulis*). **Spikelets** of several to many subdistichous glumes, lowest 3 or 4 (or more) glumes empty, next with male or functionally male floret, then 1

bisexual fertile floret, uppermost glume sometimes appearing empty but in reality subtending bisexual floret (see Browning 1994). **Perianth** of 5 or 6 slender bristles. **Stamens** 3. **Style** long, 3-branched. **Nutlet** brown, oblong-obovoid, trigonous, smooth, crowned with persistent pyramidal style base.

Species ± 19, Africa, Madagascar, Australia; 1 in sthn Afr.: *Costularia natalensis* C.B.Clarke, Mpumalanga, Swaziland and KwaZulu-Natal.

Courtoisina Soják 0461050

Soják: 193 (1979); Gordon-Gray: 209 (1995).

Courtoisia Nees: 261 (1834) not of Marchand; Clarke: 403 (1902); Schonland: 32 (1922). *Mariscus* Vahl in part; Podlech: 31 (1967); Gordon-Gray: 123 (1995). *Cyperus* L. subgen. *Mariscus* (Vahl) C.B.Clarke in part; Kükenthal: 402 (1936).

Medium-sized annuals, forming small tufts; strong-smelling when dry (fenugreek odour—Goetghebeur 1986). **Culms** with basal nodes. **Leaves** basal, eligulate; sheath with adaxial apex truncate; blade linear with keeled midrib, profile V-shaped. **Inflorescence** bisanthelate; subtending bracts up to 9, spreading. **Spikes** ± rounded; spikelet bracts several, spirally arranged. **Spikelets** ovate, 1–9-flowered, falling entire; glumes distichous, winged on keel, mucronate. **Perianth** 0. **Stamens** 3. **Style** 3-branched. **Nutlet** brown, linear-oblong, narrowed at base and apex, triangular, papillate.

Species 2, India, Africa and Madagascar, 2 in sthn Afr., occurring in Namibia, Botswana, Northern Province, North-West, Gauteng, Free State and Northern Cape.

One of the species: *Courtoisina cyperoides* (Roxb.) Soják, is apparently represented in sthn Afr. by a subspecies (Vorster 1978), for which there is as yet no combination in *Courtoisina*.

Cyathocoma Nees 0494020

Nees: 300 (1835).

Macrochaetium Steud.: 159 (1855); Clarke: 291 (1898); Schonland: 62 (1922); Levyns: 77 (1947); Levyns: 128 (1950); Gordon-Gray: 111 (1972); Bond & Goldblatt: 44 (1984). *Ideleria* Kunth: 310 (1837) name illegitimate. *Tetraria* P.Beauv. subgen. *Eutetraria* (C.B.Clarke) Kük. in part; Kükenthal: 195 (1940).

Robust perennials, up to 1 m tall, with short horizontal rhizomes. **Culms** erect, with aerial nodes. **Leaves** eligulate, basal ones stout, up to 300 mm long, subdistichous; basal sheaths large, striate, adaxial apex V-shaped; blade without keeled midrib, profile thickly crescentiform. **Inflorescence** a large, fairly dense panicle; lowest bracts foliaceous. **Spikelets** straw-coloured to chestnut-red, ellipsoid, of 4 or 5 spirally arranged glumes, lowest 1 or 2 glumes empty, often aristate, next 1 fertile, bisexual, followed by 1 male floret or empty glume. **Perianth** of 6 bristles, longer than nut, sparsely barbate. **Stamens** 6. **Style** with swollen, conical, hispid base, shortly 3-branched. **Nutlet** brown to red-brown, obovate, 3-angled, with conspicuous hairy beak.

Species 3, Western Cape to KwaZulu-Natal with *Cyathocoma bachmannii* (Kük.) C.Archer possibly also in Mozambique.

Recently Bruhl: 129 (1995) has shown that *Cyathocoma* Nees predates *Macrochaetium* Steud.

Cyperus L. 0459000

Linnaeus: 74 (1753); Thunberg: 18 (1794); Schrader: 4 (1832); Clarke: 162 (1897); Clarke: 310 (1901); Schonland: 24 (1922); Kükenthal: 42 (1935) in broad sense; Levyns: 98 (1950) in broad sense; Podlech: 7 (1967); Gordon-Gray: 103 (1972); Compton: 60 (1976); Bond & Goldblatt: 39 (1984); Forbes: 50 (1987); Gordon-Gray: 45 (1995).

Juncellus C.B.Clarke: 594 (1893); Clarke: 161 (1897); Clarke: 306 (1901); Schonland: 23 (1922); Podlech: 28 (1967); Gordon-Gray: 105 (1972); Bond & Goldblatt: 43 (1984); Forbes: 39 (1987). *Cyperus* L. subgen. *Juncellus* C.B.Clarke: 33 (1884); Kükenthal: 315 (1936). *Mariscus* Vahl: 372 (1805) name conserved; Thunberg: 18 (1794); Schrader: 12 (1832); Clarke: 185 (1897); Clarke: 377 (1901); Schonland: 29 (1922); Podlech: 31 (1967); Gordon-Gray: 105 (1972); Compton: 66 (1976); Bond & Goldblatt: 44 (1984); Forbes: 53 (1987); Gordon-Gray: 123 (1995). *Cyperus* L. subgen. *Mariscus* (Vahl) C.B.Clarke: 34 (1884); Kükenthal: 402 (1936).

Mainly perennials, tufted, long-stoloniferous, or long-rhizomatous, sometimes producing corms or tubers, sometimes strong-smelling when dry (fenugreek odour—Goetghebeur 1986). **Culms** with basal nodes, rounded, 3-angled or flattened. **Leaves** mostly basal, ligulate or eligulate; sheath occasionally persistent, swollen, forming 'bulb', adaxial apex truncate, V- or U-shaped; blade linear, short or 0, with keeled midrib, profile V-shaped, flanged V-shaped or crescentiform. **Inflorescence** sometimes pseudolateral, a single spikelet, or capitate, or simply or compoundly anthelate, sometimes proliferous; subtending bracts foliose or scale-like. **Spikelets** of several to many distichous glumes, 2 lowest empty, upper several to many with bisexual, fertile florets, uppermost with male floret or empty; glumes and nuts falling in age succession with rachilla persistent, or entire spikelet with rachilla caducous, disarticulating from a cushion below lowest fertile floret. **Perianth** 0. **Stamens** 1–3. **Style** slender, 2- or 3-branched, rarely simple or 2- or 3-fid. **Nutlet** oblong to obovate, biconvex with rounded side facing rachilla, or 3-angled, smooth or papillate. x = 5, 8 (6, 7, 9, 13) (high aneuploids, high polyploidy).

Species ± 550, ± cosmopolitan; over 80 in sthn Afr., widespread, Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

This genus is sometimes treated in a broad sense, to include *Alinula*, *Courtoisina*, *Kyllinga* and *Pycreus*, see e.g. Kükenthal (1935); Haines & Lye (1983). *Mariscus* may also be treated as a separate genus, see e.g. Podlech (1967);Vorster (1978). *Cyperus* includes the 'world's worst weed', *C. rotundus* L. (Holm *et al.* 1977). *C. papyrus* L. was used for paper-making in the Nile Valley until ± 8 A.D. (Mabberley 1997).

Eleocharis R.Br. 0469000

Brown: 224 (1810); Clarke: 197 (1898); Clarke: 758 (1900); Clarke: 404 (1902); Schonland: 33 (1922); Podlech: 18 (1967); Gordon-Gray: 109 (1972); Compton: 71 (1976); Bond & Goldblatt: 39 (1984); Forbes: 46 (1987); Gordon-Gray: 76 (1995).

Heleocharis T.Lestib.: 41 (1819); Levyns: 108 (1950). *Scirpus* L. in part; Schrader: 29 (1832).

Mainly perennials, tufted, long-stoloniferous, or long-rhizomatous. **Culms** erect, with basal nodes. **Leaves** ligulate or eligulate; sheath with adaxial apex truncate; blade 0 or (rarely) short. **Inflorescence** a single spikelet, sometimes proliferous. **Spikelets** of many spirally arranged, imbricate glumes, lowest 1 or 2 glumes empty, upper bisexual, fertile, uppermost with male florets or empty. **Perianth** of ± 6 scabrous bristles, often some rudimentary. **Stamens** (2)3. **Style** much thickened at base, forming a persistent, triangular structure; branches 2 or 3. **Nutlet** white, brown or black, elliptic to obovate, compressed or 3-angled, smooth. x = 5 (6, 7, 8, 9) (high aneuploids, high polyploidy).

Species 200, ± cosmopolitan; ± 12 in sthn Afr.; widespread, Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

Epischoenus C.B.Clarke 0477010

Clarke: 273 (1898); Schonland: 57 (1922); Levyns: 120 (1950); Levyns: 69 (1959); Bond & Goldblatt: 39 (1984).

Tetraria P.Beauv. in part; Clarke: 275 (1898); Clarke: 759 (1900). *Tetraria* P.Beauv. subgen. *Epischoenus* (C.B.Clarke) Kük.: 204 (1940). *Schoenus* L. in part; Boeckeler: 273 (1874).

Perennials up to ± 1.3 m tall. **Culms** with basal nodes, terete, occasionally quadrangular in section. **Leaves**

basal, eligulate; sheath split or tubular, firm, deep red towards base, adaxial apex V-shaped; blade well developed or minute or 0, profile circular to elliptical. **Inflorescence** of few to several spikelets in a short raceme. **Spikelets** of 4–8, 2-ranked glumes; basal 4–8 glumes empty, then 1–3 male florets with or without an aborted gynoecium, usually penultimate glume fertile, bisexual, uppermost 1 or 2 empty; axis of spikelet above ovary elongated, thickened, and curved round nut. **Perianth** 0. **Stamens** 3. **Style** 3-branched. **Nutlet** marble-white, subglobose, obscurely 3-angled, smooth.

Species 8, sthn Afr., Western and Eastern Cape, possibly also KwaZulu-Natal.

Ficinia Schrad. 0465000

Schrader: 143 (1832) name conserved; Kunth: 251 (1837); Clarke: 235 (1898); Clarke: 759 (1900); Clarke: 460 (1902); Pfeiffer: 1 (1920); Podlech: 21 (1967); Gordon-Gray: 108 (1972); Compton: 68 (1976); Bond & Goldblatt: 40 (1984); Forbes: 47 (1987); Gordon-Gray: 81 (1995).

Melancranis Vahl: 239 (1805); Schrader: 49 (1832); Kuntze: 755 (1891). *Acrolepis* Schrad.: 2066 (1821); Kunth: 330 (1837); Boeck.: 89 (1871/3). *Hemichlaena* Schrad.: 40 (1832); Nees: 283 (1835); Kunth: 330 (1837); Boeck.: 87 (1871/3). *Pleuraclne* Schrad.: 47 (1832). *Sickmannia* Nees: 292 (1835); Levyns: 117 (1950). *Schoenus* L. in part; Thunberg: 16 (1794); Schrader: 24 (1832); Kunth: 335 (1937). *Scirpus* L. in part; Thunberg: 17 (1794).

Perennials, tufted, long-rhizomatous or long-stoloniferous, sometimes branching. **Culms** with basal nodes, terete, striate, channelled or flattened. **Leaves** either basal or cauline, conspicuously ligulate, or eligulate; sheath with adaxial apex truncate; blade linear, setaceous or 0, with or without keeled midrib, profile V-shaped (rarely), crescentiform or elliptical. **Inflorescence** a spikelet, a head, a spike of spikelets, or an umbel or panicle of heads; subtending bracts foliose, sometimes scale-like, spreading or erect, bases frequently expanded, partially enveloping inflorescence. **Spikelets** of many, rarely few, spirally imbricate glumes, the lowest 1–few glumes empty, upper several to many bisexual, fertile, uppermost with male florets or empty. **Perianth** 0. **Stamens** 3(2). **Ovary** on an obpyramidal gynophore produced into small ± fleshy angular cup with or without 2 or 3 free or partially fused lobes. **Style** linear, uniform, with 3(2) branches, occasionally branches rudimentary or 0. **Nutlet** ovoid to obovate, 3-angled, biconvex or adaxially concave, rarely dorsally compressed, smooth to rugose, shed with gynophore.

Species ± 60, Africa, mainly sthn Afr.; mostly Western Cape with a few in Northern Province, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho, Northern and Eastern Cape with 1 in Namibia and ± 2 reaching Tanzania.

Fimbristylis Vahl 0471000

Vahl: 285 (1805) name conserved; Clarke:199 (1898); Clarke: 411 (1902); Schonland: 33 (1922); Podlech: 21 (1967); Gordon-Gray: 549 (1971) including *Abildgaardia* Vahl; Gordon-Gray: 110 (1972); Compton: 71 (1976); Bond & Goldblatt: 42 (1984); Forbes: 47 (1987); Gordon-Gray: 89 (1995).

Annuals or perennials, mainly tufted. **Culms** with basal nodes. **Leaves** basal, ligulate or eligulate; sheath with adaxial apex truncate; blade linear, sometimes 0, without keeled midrib, profile V-shaped or crescentiform. **Inflorescence** a simple, compound, or congested umbel, or single spikelet. **Spikelets** of many, usually spirally arranged, imbricate glumes; glumes very rarely subdistichous, lowest 1 or 2 empty, several to many above bisexual, fertile, uppermost with male florets or empty. **Perianth** 0. **Stamens** 1–3. **Style** 2- or 3-fid, villous or glabrous, with base enlarged and constricted above ovary and wholly caducous. **Nutlet** obovate, biconvex or 3-angled, smooth or trabeculate. $x = 3, 5$ (8, 11) (aneuploids, polyploidy).

Species ± 300, ± cosmopolitan in warm and temperate regions; ± 8 in sthn Afr., widespread in Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Eastern and Northern Cape.

Fuirena Rottb. 0467000

Rottbøll: 70, t. 19 (1773); Schrader: 15 (1832); Clarke: 260 (1898); Clarke: 461 (1902); Podlech: 24 (1967); Gordon-Gray: 108 (1972); Compton: 69 (1976); Bond & Goldblatt: 42 (1984); Forbes: 49 (1987); Gordon-Gray: 96 (1995).

Annuals or perennials; tufted or with elongated woody, usually horizontal, rhizomes. **Culms** nodose, usually leafy. **Leaves** cauline, ligulate; basal sheath closed, adaxial apex truncate to V-shaped; blade short or well developed, flat, linear, with keeled midrib, profile V-shaped or flanged V-shaped. **Inflorescence** a paniculate corymb, elongate, with remote lower branches, often reduced to a ± subterminal head, sometimes to 3–few spikelets. **Spikelets** of many spirally imbricate glumes, 2 lowest glumes empty, upper several to many bisexual, fertile, aristate, hairy, uppermost with male florets or empty. **Perianth** of 1, 3 or 6 scales or bristles or both, sometimes rudimentary or 0. **Stamens** 2 or 3. **Style** linear, often short, with base usually persistent; branches 3, elongate. **Nutlet** obovoid, 3-angled, sessile, falling with perianth when present, crowned with persistent style base. $x = 9, 13, 19, 23$.

Species ± 30, ± cosmopolitan in warm areas; ± 12 in sthn Afr., widespread in Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

Hellmuthia Steud. 0503010

Steudel: 90 (1855); Haines & Lye: 61 (1976); Bond & Goldblatt: 42 (1984).

Scirpus L. in part; Thunberg: 17 (1794); Clarke: 224 (1898); Schonland: 36 (1922); Levyns: 101 (1950).

Perennials, tufted. **Culms** erect, with basal nodes, terete. **Leaves** eligulate; sheath split to base; blade short or 0, without keeled midrib, profile thickly crescentiform. **Inflorescence** capitate; subtending bracts erect. **Spikes** 1–10, ellipsoid-cylindric, obtuse. **Spikelets** elliptical to lanceolate, dorsiventrally compressed. **Perianth** 0. **Stamens** 3. **Style** short; branches 3, long. **Nutlet** grey or black, obovoid, flattened, minutely papillose, falling with filaments.

Species 1: *Hellmuthia membranacea* (Thunb.) R.W.Haines & Lye, Western Cape coast from Cape Peninsula to Knysna.

Isolepis R.Br. 0468020

Brown: 221 (1810); Schrader: 14 (1832); Kunth: 187 (1837); Raynal: 49 (1977b); Bond & Goldblatt: 43 (1984); Gordon-Gray: 104 (1995).

Eleogiton Link: 284 (1827). *Scirpus* L. subgen. *Fluitanthes* C.B.Clarke: 213 (1898). *Scirpus* L. subgen. *Isolepis* C.B.Clarke in part: 216 (1898); Clarke: 759 (1900); Clarke: 446 (1902). *Scirpus* L. in part; Schonland: 36 (1922); Gordon-Gray: 109 (1972); Compton: 70 (1976); Forbes: 59 (1987).

Ficinia Schrad. in part; Pfeiffer: 14 (1920).

Mostly annuals or slender perennials, occasionally wholly aquatic, usually tufted, sometimes long-stoloniferous, occasionally producing corms. **Culm** with aerial or basal nodes, terete, frequently capillary. **Leaves** basal or cauline, eligulate; sheath with adaxial apex truncate; blade 0 to well developed, linear or setaceous, without keeled midrib, profile crescentiform. **Inflorescence** sometimes pseudolateral, a single spikelet or capitate, sometimes proliferous. **Spikelets** 1–many; all glumes fertile, bisexual. **Perianth** 0(6), when present, of

bristles. **Stamens** 1–3. **Ovary** sessile or with short gynophore. **Style** base frequently persistent, branches 2 or 3. **Nutlet** linear, ovoid or obovate, biconvex or 3-angled, smooth, papillose, trabeculate or rugose. x = 12, 13, 14 (polyploidy).

Species ± 60, widely distributed in temperate and subtropical parts of the world; ± 30 in sthn Afr., concentrated in Western Cape, also in Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho, Northern and Eastern Cape.

Kyllinga Rottb. 0462000

Rottbøll: 12, t. 4 (1773) in part, name conserved; Clarke: 151 (1897); Clarke: 268 (1901); Schonland: 19 (1922); Podlech: 29 (1967); Gordon-Gray: 107 (1972); Compton: 68 (1976); Getliffe: 261 (1983); Bond & Goldblatt: 44 (1984); Forbes: 51 (1987); Gordon-Gray: 111 (1995).

Cyperus L. subgen. *Kyllinga* (Rottb.) J.V.Suringar: 42 (1898); Kükenthal: 566 (1936).

Mainly perennials, tufted or long-rhizomatous, frequently lemon-scented. **Culms** with basal nodes. **Leaves** basal, eligulate; sheath with adaxial apex truncate; blade linear with keeled midrib, profile V-shaped. **Inflorescence** capitate, of 1–3 sessile spikes, sometimes proliferous; subtending bracts 3–6. **Spikes** ovoid or cylindric, dense. **Spikelets** many, of 4–7 distichous glumes, lowest 1 or 2 glumes empty, next 1 or 2 with bisexual, fertile florets, upper ones with male florets or empty; rachilla wingless, caducous by disarticulation from a cushion below lowest fertile floret. **Perianth** 0. **Stamens** 1–3. **Style** slender, 2-branched. **Nutlet** black or brown, ellipsoid or oblong, laterally compressed (i.e. with edge facing rachilla), smooth. x = 6, 8 (7, 9) (polyploidy).

Species ± 60, ± cosmopolitan in warm moist areas; ± 13 in sthn Afr., widespread in Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

Kyllingiella R.W.Haines & Lye 0468008

Haines & Lye: 176 (1978).

Scirpus L. in part; Clarke: 210 (1898); Clarke: 446 (1902); Podlech: 44 (1967).

Small perennials, tufted. **Culms** with basal nodes. **Leaves** basal, eligulate; sheath with adaxial apex truncate; blade linear with keeled midrib, profile V-shaped. **Inflorescence** capitate; subtending bracts spreading-reflexed. **Spikes** several, rounded to ovate. **Spikelets** many, 1-flowered. **Perianth** 0. **Stamens** 1. **Style** branches 2 or 3. **Nutlet** ovoid to obovate, papillose. x = 12.

Species ± 4; 1 in sthn Afr.: *Kyllingiella microcephala* (Steud.) R.W.Haines & Lye, scattered in Namibia, Botswana, Northern Province and North-West.

Lipocarpha R.Br. 0452000

Brown: 459 (1810) name conserved; Clarke: 265 (1898); Clarke: 468 (1902); Schonland: 53 (1922); Gordon-Gray: 103 (1972); Compton: 59 (1976); Forbes: 53 (1987); Goetghebeur & Van den Borre: 1 (1989); Gordon-Gray: 120 (1995).

Hemicarpha Nees: 287 (1835); Podlech: 27 (1967). *Rikliella* J.Raynal: 154 (1973). *Scirpus* L. in part (*Scirpus hystrix* not of Thunb.); Clarke: 233 (1898); Clarke: 459 (1902); Podlech: 49 (1967). *Scirpus* L. subgen. *Chloroscirpus* Cherm. (*Scirpus hystrix* not of Thunb.): 141 (1937). *Scirpus* L. sect. *Squarrosi* Cherm.: 141 (1937).

Annuals or perennials, tufted, small or moderately robust. **Culms** erect, terete, glabrous, with basal nodes. **Leaves** basal, eligulate, glabrous; sheath short, with adaxial apex truncate; blade with or without keeled midrib, profile V-shaped or crescentiform. **Inflorescence** capitate, of 1–20 sessile spikes; subtending bracts 2–few, erect or spreading. **Spikes** ovoid, axes elongated; spikelet bracts many, spirally arranged, lowermost and uppermost frequently empty. **Spikelets** comprising an adaxial prophyll, with frequently 2 minute hyaline scales and a 1-flowered floret subtended by a glume; florets mostly bisexual, fertile, uppermost male or absent. **Perianth** 0. **Stamens** 1–3. **Style** linear or 0, branches 2 or 3, short, not dilated at base, deciduous. **Nutlet** narrowly oblong to broadly obovate to circular to 3-angled, papillate. x = 13 (8, 19, 23, 29) (aneuploids, polyploidy).

Species ± 35, ± cosmopolitan in warm climates; 6 in sthn Afr., widespread in Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal and Lesotho.

Neesenbeckia Levyns 0494020

Levyns: 74 (1947); Levyns: 128 (1950); Bond & Goldblatt: 44 (1984).

Buekia Nees: 300 (1835) not of Giseke. *Tetraria* P.Beauv. section *Buekia* (Nees) C.B.Clarke in part: Clarke: 290 (1898). *Tetraria* P.Beauv. subgen. *Eutetraria*, C.B.Clarke: 277 (1898) in part; Kükenthal: 195 (1940).

Perennials, tufted. **Culms** erect, cylindrical, with basal nodes. **Leaves** ligulate; sheath with adaxial apex V-shaped; blade: lower 0, upper 1(–2) elongated, profile circular. **Inflorescence** pseudolateral, paniculate, of many spikelets; subtending bracts erect, leaf-like, lowest much longer than remainder. **Spikelets** of 6 or 7 bracts, not definitely 2-ranked, ± lowest 4 glumes empty, shortly awned, followed by a male floret with aborted gynoecium, and then a fertile, bisexual glume. **Perianth** of 6 bristles, long and slender, minutely hairy. **Stamens** 3. **Style** with swollen base, 6-branched. **Nutlet** with short gynophore, broadly ovoid, upper half wrinkled.

Species 1: *Neesenbeckia punctoria* (Vahl) Levyns (= *Tetraria punctoria* (Vahl) C.B.Clarke), Western Cape.

Oxycaryum Nees 0468005

Nees: 90 (1842); Lye: 280 (1971a); Gordon-Gray: 137 (1995).

Scirpus L. in part; Clarke: 446 (1902); Gordon-Gray: 109 (1972).

Aquatic long-stoloniferous perennials. **Culms** with basal nodes, 3-angled. **Leaves** basal, ligulate; sheath with conspicuous venation, adaxial apex V-shaped; blade flat with keeled midrib, profile V-shaped. **Inflorescence** anthelate; subtending bracts spreading. **Spikes** ± globose. **Spikelets** many, dense; glumes spirally arranged. **Perianth** 0. **Stamens** 3. **Style** base persistent, branches 2. **Nutlet** ± ovoid, sessile, with corky tissue enveloping base.

Species 1: *Oxycaryum cubense* (Poeppig & Kunth) Lye, widespread in tropical Africa and Central and South America; in sthn Afr. in Okavango Swamps, Namibia and Botswana and Tongaland (N KwaZulu-Natal).

Pseudoschoenus (C.B.Clarke) Oteng-Yeb. 0468040

Oteng-Yeboah: 308 (1974).

Scirpus L. subgen. *Pseudoschoenus* C.B.Clarke: 233 (1898). *Schoenus* L. in part; Thunberg: 16 (1794). *Scirpus* L. in part; Schonland: 36 (1922); Bond & Goldblatt: 45 (1984).

Perennials, long-rhizomatous. **Culms** with basal nodes, stout, terete. **Leaves** eligulate; sheath with adaxial apex truncate; blade 0. **Inflorescence** an elongated, branched panicle, branches flexuose; subtending bract erect, sheathing, scale-like. **Spikelets** cylindric, 12–24-flowered; florets mostly bisexual, sometimes a few functionally female. **Perianth** of 3–5 bristles. **Stamens** 3; anthers crested. **Style** base persistent, branches 3. **Nutlet** narrowly ellipsoid, 3-angled, smooth.

Species 1: *Pseudoschoenus inanis* (Thunb.) Oteng-Yeb., interior of sthn Afr., Free State, Lesotho, Northern, Western and Eastern Cape.

Pycreus P.Beauv. 0459010

Beauvois: 48 (1816a); Clarke: 155 (1897); Clarke: 288 (1901); Schonland: 21 (1922); Podlech: 38 (1967); Gordon-Gray: 105 (1972); Compton: 64 (1976); Bond & Goldblatt: 44 (1984); Forbes: 55 (1987); Gordon-Gray: 137 (1995).

Cyperus L. subgen. *Pycreus* (P.Beauv.) A.Gray: Kükenthal: 326 (1936).

Annuals or perennials, tufted or long-rhizomatous. **Culms** with basal nodes. **Leaves** mainly basal, sometimes cauline, ligulate or eligulate; sheath with adaxial apex truncate or n-shaped; blade linear, sometimes short, with or without keeled midrib, profile V-shaped, occasionally crescentiform. **Inflorescence** sometimes pseudolateral, mostly anthelate, sometimes capitate or paniculate. **Spikelets** of many distichous glumes, 2 lowest glumes empty, upper several to many bisexual, fertile, uppermost with male florets or empty; rachilla persistent, wingless. **Perianth** 0. **Stamens** 2 or 3. **Style** slender, 2-branched. **Nutlet** oblong or ellipsoid, laterally compressed (i.e. with edge of nutlet facing rachilla), smooth, papillose or rugose. x = 10 (12) (aneuploids, high polyploidy).

Species ± 70, ± cosmopolitan in warm moist areas; ± 15 in sthn Afr., widespread, Namibia, Botswana, Northern Province, North-West, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

Rhynchospora Vahl 0492000

Vahl: 229 (1805) name conserved; Clarke: 267 (1898); Clarke: 478 (1902); Schonland: 54 (1922); Podlech: 43 (1967); Gordon-Gray: 111 (1972); Compton: 73 (1976); Bond & Goldblatt: 44 (1984); Forbes: 58 (1987); Gordon-Gray: 148 (1995).

Annuals or perennials, sometimes robust, tufted or long-rhizomatous. **Culms** erect, with aerial nodes. **Leaves** long, eligulate; sheath with adaxial apex n-shaped to truncate; blade with keeled midrib, profile V-shaped. **Inflorescence** capitate, paniculate or anthelate (of several heads), each of 1 or more spikelets. **Spikelets** of spirally imbricate glumes; basal 3 or 4 glumes empty, 1 or 2 above fertile, bisexual, uppermost with male floret or empty. **Perianth** of (0)6 barbate bristles. **Stamens** 2 or 3. **Style** elongate, swollen at base; branches 2, short or long. **Nutlet** obovoid to narrowly oblong, compressed, rugose, papillose or smooth, crowned with persistent style base. x = 5, 13 (8, 9) (aneuploids, polyploidy).

Species ± 250, cosmopolitan, mainly America; ± 8 in sthn Afr., widespread, Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Lesotho and Eastern Cape with 1 reaching Western Cape.

Schoenoplectus (Rchb.) Palla 0468010

Palla: 49 (1888) name conserved; Raynal: 537 (1976a); Raynal: 119 (1976b); Gordon-Gray: 153 (1995).

Pterolepis Schrad.: 30 (1832). *Scirpus* L. in part; Thunberg: 17 (1794); Clarke: 210 (1898); Clarke: 446 (1902); Podlech: 44 (1967); Gordon-Gray: 109 (1972); Compton: 70 (1976); Forbes: 59 (1987).

Annuals or perennials, tufted or long-rhizomatous. **Culms** with basal nodes, terete or 3-angled, sometimes hollow with conspicuous transverse septa. **Leaves** basal, ligulate or eligulate; sheath with adaxial apex truncate or V-shaped; blade usually 0. **Inflorescence** pseudolateral, capitate or corymbose, sometimes proliferous; subtending bract appearing as a continuation of culm. **Spikelets** few to many, of many spirally imbricate glumes; lowest 1 or 2 glumes sterile, upper bisexual, fertile, uppermost with male florets or empty. **Perianth** of 0–6 bristles, smooth, retrorsely scabrid, or plumose. **Stamens** 3; filaments often persistent after anthers have fallen. **Style** slender, elongate, passing gradually into ovary, 2- or 3-branched, deciduous or sometimes persistent. **Nutlet** oblong or obovoid, biconvex or 3-angular, smooth or rugose. x = 7 (11) (aneuploids, high polyploidy).

Species ± 50, widely distributed in tropical and temperate regions; ± 18 in sthn Afr., Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

Schoenoxiphium Nees 0521000

Nees: 531 (1832); Clarke: 297 (1898); Kükenthal: 28 (1909); Schonland: 66 (1922); Gordon-Gray: 112 (1972); Compton: 74 (1976); Kukkonen: 819 (1983); Bond & Goldblatt: 44 (1984); Kukkonen: 364 (1986); Forbes: 58 (1987); Gordon-Gray: 162 (1995).

Carex L. in part; Thunberg: 14 (1794); Clarke: 299 (1898). *Kobresia* Willd. in part; Koyama: 37 (1961).

Perennials, tufted. **Culms** erect, with aerial nodes. **Leaves** basal and cauline, ligulate; sheath with adaxial apex truncate; blade linear, flat or setaceous, with or without keeled midrib, profile V-shaped. **Inflorescence** a reduced or large panicle. **Spikelets** unisexual or bisexual, florets unisexual; female floret subtended by, and partially or completely enclosed by, modified prophyll (perigynium) together with abaxial rachilla; rachilla sometimes vestigial, frequently carrying exserted male spikelet of 1–6 florets. **Perianth** 0. **Stamens** 1–3. **Style** 3-branched. **Nutlet** brown, ovate, oblong, elliptic or obovate, 3-angled to somewhat flattened, beaked, smooth.

Species ± 12; few in tropical Africa, widespread in sthn Afr., Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

Schoenus L. 0477000

Linnaeus: 42 (1753); Clarke: 271 (1898); Clarke: 483 (1902); Schonland: 57 (1922); Levyns: 120 (1950); Bond & Goldblatt: 45 (1984); Gordon-Gray: 171 (1995).

Chaetospora R.Br. in part; Kunth: 323 (1837); Boeckeler: 290 (1874). *Elynanthus* (P.Beauv.) T.Lestib. in part; Nees: 186 (1836); Kunth: 309 (1837).

Perennials, glabrous, tufted. **Culms** with basal nodes. **Leaves** basal, ligulate; sheath with adaxial apex V-shaped; blade setaceous, without keeled midrib, profile thickly crescentiform. **Inflorescence** capitate; subtending bracts 2, erect, lower with base expanded, blade leaflike. **Spikelet** of 6–10, 2-ranked floral bracts, lowest 4–7 bracts empty, upper 1–3 fertile, bisexual, terminal ones with male florets or empty; fertile axis elongate, flexuose, exposing nutlets in excavations or hollows. **Perianth** of 3–5 minute bristles. **Stamens** 3. **Style** linear, sometimes base slightly swollen, 3-branched. **Nutlet** white, sessile or stalked, ellipsoid, 3-angled or anterior angle rounded, smooth. x = 11 (9) (aneuploids, polyploidy).

Species ± 100, widespread but mainly Australia; 1 in sthn Afr.: *Schoenus nigricans* L., Western and Eastern Cape, occasional in Mpumalanga and S KwaZulu-Natal.

Scirpoides Ség. 0468050

Séguier: 73 (1754); Browning & Gordon-Gray: 315 (1994).

Scirpus L. in part; Clarke: 210 (1898); Clarke: 446 (1902); Levyns: 101 (1950); Podlech: 44 (1967); Bond & Goldblatt: 45 (1984); Forbes: 59 (1987); Browning: 422 (1989).

Perennials, tufted or long-rhizomatous with uniseriate culms. **Culms** with basal nodes, terete to somewhat flattened. **Leaves** basal, eligulate; sheath with adaxial apex V-shaped; blade 0 to very short, without keeled midrib, profile elliptical. **Inflorescence** pseudolateral, capitate, of 10–60 sessile spikelets or with 1–6 stalked globose clusters of several sessile spikelets; basal bract

erect, appearing as a continuation of culm. **Spikelets** bisexual (plants functionally dioecious in *S. dioecus*); glumes several, spirally arranged, emucronate or mucronate. **Perianth** 0. **Stamens** 3. **Style** base persistent; branches 3. **Nutlet** elliptic to obovate, 3-angled, minutely reticulate.

Species ± 5, cosmopolitan in temperate regions; ± 3 in sthn Afr., coastal in KwaZulu-Natal, Northern, Western and Eastern Cape or in salt pans in Namibia, Botswana, Northern Province, North-West, Mpumalanga, Free State and Northern Cape.

Muasya *et al.* (1998) showed that *Scirpoides nodosus* (Rottb.) Soják is better placed in *Ficinia* Schrad.; however the combination has not yet been effected.

Scirpus L. 0468000

Linnaeus: 47 (1753); Clarke: 210 (1898) in part; Clarke: 446 (1902) in part; Podlech: 44 (1967) in part; Gordon-Gray: 109 (1972) in part; Gordon-Gray: 174 (1995).

Perennials, usually tufted, sometimes with runners. **Culms** with basal nodes. **Leaves** basal, sometimes cauline, ligulate; blade linear. **Inflorescence** capitate or digitate. **Spikelets** usually of many spirally imbricate glumes; lowest 1 or 2 glumes sterile, upper bisexual, fertile, uppermost with male florets or empty. **Perianth** of 0–6 bristles, retrorsely scabrid, rarely plumose. **Stamens** 1–3. **Ovary** sessile or with short gynophore. **Style** slender, elongate, rarely short, passing gradually into ovary, 2- or 3-branched, deciduous or sometimes persistent. **Nutlet** oblong or obovoid, biconvex or 3-angular. x = 5, 7, 8 (6, 9, 11) (aneuploids, high polyploidy).

Species ± 20, mostly northern hemisphere, usually wet places; ± 4 in sthn Afr., Northern Province, North-West, Gauteng, Mpumalanga, Free State, Swaziland, KwaZulu-Natal, Lesotho, Northern and Eastern Cape.

This genus is currently being redefined. In recent years the following sthn Afr. genera have been removed from *Scirpus* in its broad sense: *Bolboschoenus*, *Isolepis* (including *Eleogiton*), *Kyllingiella*, *Oxycaryum*, *Pseudoschoenus*, *Schoenoplectus* and *Scirpoides*. It is likely that *Scirpus* in its strict sense does not occur in sthn Afr.

Scleria P.J.Bergius 0515000

Bergius: 142, t. 4 (1765); Clarke: 293 (1898); Clarke: 493 (1902); Schonland: 64 (1922); Podlech: 51 (1967); Gordon-Gray: 111 (1972); Compton: 73 (1976); Franklin Hennessy: 505 (1985); Forbes: 63 (1987); Gordon-Gray: 178 (1995).

Perennials or annuals, tufted, long-stoloniferous or long-rhizomatous, sometimes tuberous. **Culms** erect, with aerial nodes, generally 3-angled; bases sometimes swollen. **Leaves** sheathing at base, ligulate or eligulate; sheath with adaxial apex n-shaped or truncate; blade narrow, with keeled midrib, profile V-shaped to flanged V-shaped, margins scabrid. **Inflorescence** panicled. **Spikelets** unisexual or bisexual; florets all unisexual; bisexual spikelets with one basal female floret and 1–few male florets above; unisexual female spikelet with single female floret at base and empty glumes above; unisexual male spikelets without female floret at base and often with more than one male floret. **Perianth** cupular or 0, upper margin frequently irregularly lobed or fimbriate, mostly shed with nutlet. **Stamens** (1)2 or 3; anthers often apiculate. **Style** not dilated at base, 3-branched. **Nutlet** white to black, ovoid, bony, smooth, hairy or warty, stipitate. x = 5, 7 (aneuploids).

Species ± 250, ± cosmopolitan, in tropical and subtropical regions, except Europe, Mediterranean and Orient; 12 in sthn Afr., widespread, Namibia, Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Lesotho and Eastern Cape.

Tetraria P.Beauv. 0494000

Beauvois: 54 (1816b); Clarke: 275 (1898); Clarke: 759 (1900); Clarke: 485 (1902); Schonland: 58 (1922); Kükenthal: 195 (1940) as subgen. *Eutetraria* (C.B.Clarke) Kük.; Levyns: 73 (1947); Levyns: 121 (1950); Gordon-Gray: 111 (1972); Bond & Goldblatt: 46 (1984); Gordon-Gray: 187 (1995).

Aulacorhynchus Nees: 305 (1835); Kunth: 535 (1837). *Tetraria* P.Beauv. section *Aulacorhynchus* (Nees) C.B.Clarke; Clarke: 275 (1898). *Decalepis* Boeck.: 509 (1884), not of Wight & Arn. *Boeckeleria* T.Durand: 504 (1888). *Elynanthus* P.Beauv. ex T.Lestib.: 32 (1819). *Tetraria* P.Beauv. section *Elynanthus* (P.Beauv. ex T.Lestib.) C.B.Clarke: 275 (1898). *Tetraria* P.Beauv. subgen. *Elynanthus* (P.Beauv. ex T.Lestib.) Kük.: 205 (1940). *Lepisia* Presl: 1 (1829); Kunth: 307 (1837). *Tetraria* P.Beauv. section *Lepisia* C.B.Clarke: 276 (1898). *Sclerochaetium* Nees: 511 (1834); Kunth: 320 (1837). *Chaetospora* R.Br. in part; Schrader: 31 (1832); Kunth: 323 (1837); Boeck.: 287 (1874). *Cyathocoma* Nees in part; Boeck.: 311 (1874). *Lepidosperma* Labill. in part; Schrader: 35 (1832). *Schoenus* L. in part; Thunb.: 16 (1794); Schrader: 24 (1832); Kunth: 335 (1837).

Perennials, somewhat wiry, tufted, sometimes very robust. **Culms** with aerial or basal nodes. **Leaves** basal or basal and cauline, ligulate or eligulate; sheath conspicuous, adaxial apex n-shaped, truncate or V-shaped; blade flat to ± cylindric, or 0, with or without keeled midrib, profile V-shaped or crescentiform. **Inflorescence** capitate or paniculate, of several to many spikelets; subtending bracts foliose (sometimes short). **Spikelets** usually bisexual; glumes usually 2-ranked, occasionally somewhat spiral, 4–9 basal glumes empty, followed by 1–4 with male florets, followed by 1 fertile bisexual one, with or without 1 empty glume at apex. **Perianth** various or 0, when present, of barbate bristles. **Stamens** 3(4, 6, 8); anthers crested, often auriculate at base. **Style** dilated and scabrous at base, 3 or 4(6–9)-branched. **Nutlet** obovoid, 3(4)-angled, smooth or hairy, usually crowned with persistent style base.

Species ± 50, few in Australia and New Zealand, few in tropical Africa, mainly sthn Afr., mostly Western Cape, few extending through Eastern Cape to KwaZulu-Natal and Mpumalanga.

As currently defined the genus is rather unnatural.

Trianoptiles Fenzl 0475000

Fenzl: 113 (1836); Levyns: 21 (1943); Levyns: 119 (1950); Bond & Goldblatt: 47 (1984).

Ecklonea Steud.: 138 (1829) not *Ecklonia* of Hornem.; Schrader: 34 (1832) as *Ecklonia*; Kunth: 287 (1837) as *Ecklonia*; Clarke: 271 (1898), 759 (1900); Schonland: 56 (1922) as *Ecklonia*. *Carpha* R.Br. in part; Pfeiffer: 177 (1931). *Carpha* R.Br. subgen. *Trianoptiles* (Fenzl) Kük.: 109 (1939c).

Annuals, small, tufted. **Culms** with aerial nodes. **Leaves** basal and cauline, eligulate; sheath with adaxial apex truncate; blade linear, without a keeled midrib, profile thickly crescentiform. **Inflorescence** with spikelets of 2 kinds: partially subterranean among basal leaves, female; exposed spikelets bisexual, paniculate. **Bisexual spikelets** greenish, cymose, with 3–5, ± 2-ranked or distichous glumes, mostly with 2 perfect florets associated with uppermost glumes; perianth of 3 segments, hairy at base, expanded in middle and usually terminated by (1)3 stiff bristles; stamens 3; style 3-branched. **Nutlet** obovate, 3-angled. **Female spikelets** of 2–4, tightly sheathing, sterile, subterranean glumes and one tubular, fertile glume; perianth 0; style 3-branched. **Nutlet** ± globular.

Species 3, Northern, Western and Eastern Cape.

Volkiella Merxm. & Czech 0452010

Merxmüller & Czech: 318 (1953); Podlech: 52 (1967); Hooper: 945 (1986).

Annuals, small, tufted. **Culms** setaceous, 0–25 mm tall, with basal nodes. **Leaves** basal, eligulate; sheath closed, with adaxial apex truncate; blade without keeled midrib, profile crescentiform. **Inflorescence** capitate, of 2–4 spikes; subtending bracts erect, very long. **Spikes** 5–6 mm long, 3.5 mm broad, laterally compressed; spikelet

bracts 9–11, ± distichous, 2.5–4 mm long, produced into an awn 1–7 mm long. **Spikelets** comprising adaxial coriaceous prophyll and abaxial hyaline glume; glume subtending a single usually bisexual floret. **Perianth** 0. **Stamens** 2. **Style** short, branches 3, 2–3 times as long as nutlet. **Nutlet** yellow-brown, obovate, trigonous, 1 mm long, papillose.

Species 1: *Volkiella disticha* Merxm. & Czech, Namibia; also in south tropical Africa.

Websteria S.H.Wright 0458000

Wright: 135 (1887); Hooper: 582 (1972).

Perennial, submerged aquatics, rooted in mud. **Culms** up to 1 m long, nodose with internodes up to 250 mm long. **Leaves** cauline, eligulate; sheath conspicuous, adaxial apex truncate; blade 0. **Inflorescence** of compound-whorled branches, mostly sterile. **Spikelets** emergent, single, terminal on branches; glumes 2, ± 10 mm long, attenuated, lower empty, upper fertile; floret bisexual. **Perianth** of 6–11 barbate bristles, longer than nutlet. **Stamens** 3. **Style** 2-branched. **Nutlet** ovate, long-beaked, ± smooth.

Species 1: *Websteria confervoides* (Poir.) S.S.Hooper, tropical America, tropical Africa, Sri Lanka; in sthn Afr. in Okavango Swamps, Botswana, and presumed to be also in Caprivi, Namibia.

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Dioscoreaceae

(Liliidae—Dioscoreales)

Compiled by R.H. Archer

Dioecious climbers, rarely procumbent, herbaceous or partly woody, rarely monoecious or flowers bisexual, with tuberous or thick, woody or rhizomatous rootstocks above or partly below ground, or roots with tuberous swellings. **Leaves** alternate or sometimes opposite, cordate, sagittate, rounded or truncate at base, entire to digitately divided. **Flowers** mostly unisexual, regular, solitary, paired, or in spikes, racemes, or panicles. **Perianth** 3 + 3, fused towards base; tube urn-shaped, campanulate or almost absent. **Male flowers**: perianth 6-lobed or -fid; stamens 6, sometimes connate into a short column in central flowers; anthers 2-thecous with longitudinal slits, with thecae contiguous, on a broad connective produced above thecae into an elongate spathulate, horned appendage, or thecae separated; style absent or rudimentary. **Female flowers** with 6 free segments; staminodes sometimes present; ovary inferior, 3-locular, sometimes 3-winged, with 2 axile ovules in each locule; styles 3, short; stigmas entire or bifid. **Fruit** a 3-valved, 3-angled or 3-winged capsule, sometimes 1-seeded and indehiscent. **Seeds** compressed, winged, sometimes with a much-folded testa; embryo small; endosperm copious. $x = 10$ (8, 9) (aneuploids, high polyploidy).

Genera 5, species over 600, cosmopolitan in warm regions; sthn Afr.: genus 1, species 16.

Baker: 246 (1896); Burkill: 319 (1960).

Dioscorea L. 1252000

Linnaeus: 1032 (1753); Baker: 247 (1896); Burkill: 319 (1960); Archibald: 1 (1967); Sölch: 1 (1969); Wilkin: 19 (1999).

Testudinaria Salisb.: 147 (1824); Baker: 252 (1896).

Description as for family.

Species ± 600, ± cosmopolitan in warm regions; 16 in sthn Afr., widespread.

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Dracaenaceae

(Liliidae—Asparagales)

Compiled by R.H. Archer

Shrubs, trees or rhizomatous xerophytic perennials. **Leaves** spirally arranged, often in rosettes and crowded at base or top of stem, entire, with parallel venation, stiff, often succulent. **Flowers** ± regular, bisexual, hypogynous, in racemes or panicles; pedicels with an equal, often disc-like articulation. **Tepals** 3 + 3, petal-like, united into a short to very long tube. **Stamens** 3 + 3, arising at base of lobes, exserted; filaments filiform to inflated; anthers versatile, introrse. **Ovary** superior, trilocular with a single axile, anatropous ovule in each locule; style slender; stigma capitate. **Fruit** a berry. **Seeds** 1–3, dirty white.

Genera 1 or 2 (depending on whether *Dracaena* and *Sansevieria* are kept separate) with ± 120 species; mainly Old World tropics; sthn Afr.: genera 1 or 2, species 10.

Bos: 1 (1992); Obermeyer: 5 (1992).

Dracaenaceae is placed under Convallariaceae by A.P.G. (1988) and Judd *et al.* (1999).

Key to genera

Trees or shrubs; leaves in dense apical rosettes or cauline, usually herbaceous; inflorescence paniculate ..... **Dracaena**

Rhizomatous herbs, rarely short-stemmed; leaves basal, distichous, usually thick and fibrous; inflorescence a dense cylindrical raceme ..... **Sansevieria**

Dracaena L. 1109000

Linnaeus: 246 (1767); Baker: 274 (1896); Bos: 1 (1992); Venter: 62 (1996).

Shrubs or trees. **Leaves** spirally arranged, often congested terminally in pseudo-whorls, strap- or sword-shaped, smooth, entire, acute with clasping bases. **Inflorescences** terminal panicles of simple or branched racemes; peduncle often with reduced leaves in transition to tiny scarious floral bracts. **Flowers** whitish, fragrant, nocturnal; pedicel consisting of a basal part turning into a persistent peg, and a stalk-like obconical receptacle persistent in fruit. **Perianth** tubular with 6 recurving lobes. **Stamens** arising in throat, opposite and equal to lobes; filaments inflated. **Fruit** a globose or lobed, orange-scarlet berry. **Seeds** 1–3, large, rounded, bony. $x = 10$ (7, 8, 19) (aneuploids, high polyploidy).

Species ± 60 in warmer regions of the world, notably Africa and SE Asia; 3 in sthn Afr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Sansevieria Thunb. 1110000

Thunberg: 65 (1794); Obermeyer: 5 (1992); Van Jaarsveld: 11 (1994); Chahinian: 7 (1996).

Acaulescent, coarse, evergreen, very drought-hardy perennials, strongly rhizomatous, forming colonies; rhizome cylindrical, thick, fibrous, articulated, bearing clasping, thin, early deciduous cataphylls; roots placed below or near aerial shoots. **Leaves** sessile, rosulate or distichous, one to few, flat or cylindrical or semicylindrical with a groove on adaxial side, plain or with irregular, transverse, darker and lighter green bands; juvenile leaves may differ in shape from mature ones. **Inflorescence** a spike-like raceme. **Flowers** numerous, subsessile, in irregular clusters along scape, opening haphazardly above and below, opening towards evening and for one night only, delicately scented. **Stamens** erect, much exserted, fused to tube below; filaments filiform. **Ovary** ovoid; style long and filiform, at anthesis exserted early from closed perianth. **Fruit** a berry, smooth or tuberculate, **Seeds** 1–3, bony, covered with a thick, softly verrucose epidermis. $x = 10$ (6, 7) (aneuploids, high polyploidy).

Species ± 60, mostly tropical Africa and Asia; at least 6 in sthn Afr., widespread, except Lesotho and Western Cape.

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Eriocaulaceae

(Commelinidae—Eriocaulales)

Compiled by R.P. Glen

Perennial, rarely annual, herbs, usually with tufted habit, often hygrophilous, monoecious. **Roots** usually with white, swollen, latticed parenchyma. **Rhizome** compact, often swollen, rarely caulescent or stoloniferous. **Leaves** usually crowded, radical, grass-like, often with a white, spongy, latticed tissue at base; stipules 0. **Flowers** unisexual, regular or irregular, very small, 2- or 3-merous, in capitula on naked peduncles; with outer bracts (if present) forming a 2–several-seriate involucre; scape surrounded at base by a closed sheath; male and female flowers variously arranged on receptacle. **Sepals** (0)2 or 3, free, or variously connate, scarious or membranous, often ciliate or dorsally hairy at apex. **Petals** (0)2 or 3, free or cupular, often stipitate, thin or thick, with or without nectary gland on outer face, often ciliate or hairy. **Male flowers**: stamens 6, 4, 3 or 2, usually as many as or twice as many as petals; filaments filiform, arising on petals; anthers 1- or 2-thecous, basifixed, introrse, opening longitudinally; vestigial ovary often present. **Female flowers**: ovary 2- or 3-locular, superior, with a solitary, ventral-apical, pendulous, orthotropous, bitegmic ovule in each locule; style 2- or 3-branched, with or without 3 appendages or branches below; staminodes 0 or minute. **Capsule** 2- or 3-locular, loculicidal. **Seeds** ellipsoid or subglobose, striate, reticulate or papillate; embryo small, lenticular, forming a cup over copious starchy endosperm.

Genera 10, 6 contain aquatic species, pantropical, comprising ± 1200 species, with the greatest concentration of species in South America and Africa; sthn Afr.: genera 2, species 13.

Brown: 51 (1897); Friedrich-Holzhammer: 1 (1967); Dahlgren *et al.*: 395 (1985); Cook: 87 (1990); Obermeyer: 9 (1985).

Key to genera

Stamens 4 or 6, twice as many as the petals; petals bearing an apical dorsal gland; leaves, scape and sheaths usually glabrous ..... **Eriocaulon**

Stamens 2 or 3, as many as the petals; petals eglandular; leaves, scape and sheaths hairy ..... **Syngonanthus**

Eriocaulon L. 0828000

Linnaeus: 87 (1753); Brown: 51 (1897); Friedrich-Holzhammer: 159 (1967); Dahlgren *et al.*: 395 (1985); Obermeyer: 9 (1985); Cook: 87 (1990).

Small, tufted, perennial, marsh herbs. **Leaves** radical, numerous, grass-like, often with a latticed tissue-pattern below. **Capitula** usually white-hairy, rarely glabrous, borne on ± erect scapes surrounded by a closed sheath below, longer than leaves. **Male flowers**: sepals 2 or 3, variously connate, ciliate, bearded or glabrous at apex; petals 2 or 3, free, sometimes rudimentary or 0, inserted on raised flower axis, usually with apical gland, often hairy on inner face, ciliate or bearded above; stamens 4 or 6. **Female flowers**: sepals and petals usually free; staminodes 0; ovary 2- or 3-locular; style branches 2 or 3, simple, without appendages. **Capsule** 2- or 3-locular. **Seeds** ellipsoid or globose. x = 8, 10 (6) (aneuploids, high polyploidy).

Species 250–400, tropical and subtropical; 12 in sthn Afr., widespread, excluding Western Cape; on river banks, in seepage areas and in the shallow waters of lakes and pools.

Syngonanthus Ruhland 0832010

Ruhland: 487 (1900); Obermeyer: 19 (1985); Cook: 89 (1990).

Paepalanthus N.E.Br.: 59 (1897).

Small, tufted perennial herbs. **Roots** white-spongy, with latticed appearance. **Leaves** basal and tufted. **Capitula** on hairy or glabrescent, erect scapes, which are sheathed at base; involucral bracts few or usually 0; receptacle hairy. **Male flowers**: sepals 3, ± free, ciliate; petals forming a funnel-shaped, 3-lobed, glabrous, inrolled tube; anthers 2-thecous. **Female flowers**: sepals as in male flowers; petals fused in middle, free below and above; ovary 3-locular; style terete; stigma 3-branched, encircled by 3 epapillate appendages. **Capsule** 3-locular, thin-walled. **Seeds** ellipsoid, ribbed, minutely rostrate.

Species 80, mostly in South America with few in Africa; 1 in sthn Afr.: *Syngonanthus wahlbergii* (Wickstr. ex Körn.) Ruhland, Northern Province and Mpumalanga.

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Eriospermaceae

(Liliidae—Asparagales)

Compiled by N.L. Meyer

Perennial herbs, small to medium-sized; with single to multiple globose or irregularly shaped, hypocotyledonary tuber, sometimes with a proliferation of rhizomes or stolons; internally white, yellow, pink or purplish red, with one or more apical or lateral to basal growing points, each protected by a neck of sheathing fibrous remains of leaf bases.

Leaves 1–several, basally concentrated, synanthous or hysteranthous, erect or prostrate, glabrous or pubescent, with a distinct petiole-like base; lamina linear to lanceolate, ovate or orbicular, with complex appendages or enations sometimes produced from upper surface; also some scale-like, reduced basal leaves. **Peduncle** erect, straight or sometimes flexuose, unbranched, terete, naked. **Inflorescence** a simple raceme, few–many-flowered, cylindrical to corymbose, dense or lax, upper flowers sometimes sterile or aborted. **Bracts** minute, solitary, basal, subtending a single flower. **Pedicels** short or long, articulated at apex. **Flowers** bisexual, regular, small, diurnal; triangular in outline, rotate, campanulate or recurved, 6–14 mm in diameter. **Tepals** 3 + 3, free, dimorphic with outer spreading and inner erect, or all equal to subequal, connate at base only, uninerved, persistent, white, pink, yellow or green. **Stamens** 3 + 3, hypogynous, adnate to base of tepals; filaments filiform to broadly lanceolate; anthers peltate, dorsifixed, versatile, subglobose to oval, introrse. **Ovary** superior, sessile, 3-locular, each with 2–6 axile ovules; style 1, terete; stigma apical, small. **Fruit** a loculicidal, turbinate to ovoid capsule, emarginate, dehiscent, 3-valved, valves persistent. **Seeds** 6–12, oval to comma-shaped; testa fawn, densely covered with unicellular white hairs up to 8 mm long, turning brown with age. $x = 7$ (10, 12).

Genus 1, species 102, Africa south of the Sahara, ± 100 species in sthn Afr., concentrated in Western Cape.

Endlicher: 156 (1836) as Eriospermeae; Endlicher: 90 (1841); Dahlgren *et al.*: 168 (1985).

Eriospermum Jacq. ex Willd. 1012000

Willdenow: 110 (1799); Jacquin: t. 373–77 (1794–95); Jacquin: 72 (1795); Kunth: 649 (1843); Salisbury: 15 (1866); Harvey: 402 (1868); Bentham & Hooker: 786 (1883); Baker: 262 (1876); Baker: 369 (1896); Baker: 470 (1898); Krause: 293 (1930); Duthie: 1 (1940); Archibald: 93 (1960); Sölch *et al.*: 43 (1970); Perry: 18 (1994).

Description as for family.

Species 102, tropical and sthn Afr.; ± 100 species in sthn Afr., all countries and provinces, but mostly Western Cape.

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Flagellariaceae

(Commelinidae—Restionales)

Compiled by C. Archer

Perennial climbers, supported by tendril-tipped leaves, sometimes dioecious. **Stems** herbaceous, terete. **Leaves** alternate; blades linear-lanceolate, apex an attenuate, spirally coiled tendril, closely ribbed; basal sheath tubular but slit to base surrounding stem, forming an auriculate constriction where joined to blade. **Flowers** bisexual or unisexual, regular, small, in terminal panicles, side branches and branchlets patent and flexuose; bracts small, concave, auriculate. **Perianth** of 6 free, petaloid, oblong, obtuse, persistent segments. **Stamens** 6, hypogynous or slightly adnate to base of segments; filaments free, ultimately exserted; anthers 2-thecous, introrse, opening by longitudinal slits, early deciduous. **Ovary** superior, 3-locular, with a single axile ovule in each locule; style 3-lobed, short or 0; stigmas terete, papillate. **Fruit** a berry, 1–3-seeded. $x = 19$.

Genera 3, species ± 8, in warm regions of the Old World; sthn Afr.: genus 1, species 1.

Brown: 15 (1897); Ross: 115 (1972).

Flagellaria L. 0798000

Linnaeus: 333 (1753); Brown: 15 (1897); Ross: 115 (1972).

Description as for family.

Species 3, Asia, Africa and Fiji; 1 in sthn Afr.: *Flagellaria guineensis* Schumach., coastal area of KwaZulu-Natal and Eastern Cape as far south as East London.

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Haemodoraceae

(Liliidae—Liliales)

Compiled by R.H. Archer

Perennial, usually tufted, herbs, with a short rhizome, tuber, or corm, often with red cell-sap (phenalenones). **Leaves** radical, distichous, linear or ensiform, sheathing at base. **Flowers** bisexual, regular or ± irregular, in cymes, racemes or panicles, sometimes subumbellate, rarely solitary, often glandular-pubescent or villous. **Perianth**: lobes or segments 6, in 1 or 2 whorls; tube absent to long, straight or curved; persistent. **Stamens** 3, opposite inner perianth segments; filaments free; anthers 2-thecous, basifixed or versatile, often sagittate, opening by longitudinal slits. **Ovary** superior, inferior, or subinferior, (1, 2)3-locular, with 1–numerous axile ovules; style filiform; stigma apical, small or trifid. **Fruit** a loculicidal or septicidal capsule or indehiscent. **Seeds** solitary to many in each locule.

Genera 13, species ± 100; sthn Afr., Australia and tropical America; sthn Afr.: genera 3, species 9.

Baker: 1 (1896); Hutchinson: 831 (1973); Simpson: 722 (1990).

Key to genera

1a Rootstock a stoloniferous corm; ovary superior, with 1 fertile locule; slender plants with sparse glandular pubescence on raceme ..... **Barberetta**

1b Rootstock a rhizome; ovary superior, inferior, or subinferior, with 1–3 fertile locules; strong, tufted plants variously pubescent:

2a Ovary inferior; one stamen with a larger anther on a shorter filament; leaves ribbed ..... **Dilatris**

2b Ovary superior; stamens equal; leaves plicate ..... **Wachendorfia**

Barberetta Harv. 1158000

Harvey: 377 (1868); Baker: 2 (1896); Hilliard & Burtt: 27 (1971).

Perennial herbs, with stoloniferous corm. **Leaves** radical and cauline, sheathing, laterally flattened, narrowly elongate-elliptic. **Flowers** in terminal and axillary racemes, with scape and pedicels glandular-hairy; bract membranous, pale green, rolled round pedicel. **Perianth** segments subequal, yellow. **Stamens** subequal, divergent; anthers introrse, basifixed, slightly sagittate at base. **Ovary** superior, with 1 fertile carpel and 1 or 2 barren carpels, becoming unilocular, half ellipsoidal, with one side curved and the other flat, 1-ovulate; style apical on lower side of ovary; stigma minute. **Fruit** indehiscent, ellipsoid, with a sharp dorsal ridge, verrucose. **Seeds** oblong. $x = 10$ (polyploidy).

Species 1: *Barberetta aurea* Harv., sthn Afr., in forests of KwaZulu-Natal and Eastern Cape.

Dilatris P.J.Bergius 1160000

Bergius: 9, t. 3 fig. 5 (1767); Baker: 3 (1896); Barker: 147 (1940); Barker: 205 (1950).

Perennial herbs, tufted, with reddish, woody rhizome. **Leaves** distichous, rigid, glabrous, linear to linear-oblong, ribbed. **Scape** pubescent, longer than leaves, with few, spaced, lanceolate, amplexicaul bracts. **Flowers** in racemes, corymbs, or pseudo-umbellate panicles, helicoid, maturing from lowest upwards and branches straightening with maturity. **Perianth** segments subequal, persistent, mauve, orange or yellow, outer segments narrower and more hairy. **Stamens** 3, one with a shorter filament and larger anther; anthers versatile, sagittate. **Ovary** inferior with a solitary axile ovule in each locule, sometimes 1 or 2 carpels abortive; style slender, about equal to stamens; stigma minute. **Capsule** opening from apex, along junction of carpels to ± halfway. **Seeds** discoid, flat or convex above, concave below.

Species 4, sthn Afr., Western Cape.

Wachendorfia Burm. 1162000

Burman: 2 (1757); Baker: 1 (1896); Barker: 39 (1949); Barker: 206 (1950); Helme & Linder (1992).

Perennial herbs, with reddish, tuberous roots with red cell-sap. **Leaves** basal, lanceolate, linear or falcate, 2-ranked, plicate. **Flowers** irregular, often paniculate. **Perianth** segments spreading, subequal, usually yellow; 3 outer firmer than inner, hairy outside; 3 inner united at base and sometimes obscurely spurred. **Stamens**: filaments filiform, free, with 2 upper anthers pendulous, lowest turning sideways opposite style. **Ovary** superior, pubescent, with single ovule in each locule; style declinate; stigma capitate. **Capsule** acutely 3-angled, dehiscing loculicidally. **Seeds** globose.

Species 4, sthn Afr., Western Cape, extending to Port Elizabeth in Eastern Cape.

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Hyacinthaceae

(Liliidae—Asparagales)

Compiled by R. Williams

Perennial, bulbous herbs. **Bulb** generally with a membranous outer covering or tunic and a number of free or coalescent bulb scales. **Leaves** 1–many; basal and well developed (rudimentary in *Bowiea* and *Schizobasis*), usually deciduous; usually contemporary with flowers, sometimes developing before or after flowering; usually rosulate, simple, entire, filiform, linear, lanceolate, ovate or rarely orbiculate; usually sheathing at base; maculate or not; sometimes with papillae or hairs. **Inflorescence** with 1–many flowers, most often in a solitary and simple raceme or spike, occasionally forming a capitate head, rarely much branched and intricate, and then leaves lacking or strongly reduced; peduncle leafless (except in *Bowiea* and *Schizobasis*), glabrous, generally bracteate, at least in lower part. **Flowers** bisexual, usually regular, rarely irregular, often showy, white, blue, violet, brown, silver, green, yellow, orange or red. **Tepals** 3 + 3, generally similar but sometimes differing in size, shape and position (e.g. *Albuca*), free or more often fused below forming a campanulate, urceolate or tubular perianth tube. **Stamens** 6 in 1 or 2 whorls, or 3 (as in *Albuca* where outer whorl may be reduced or absent), arising either at base of tepals or in tepal tube; filaments free, connate or fused; anthers 2-thecous, dorsifixed or occasionally basifixed, opening longitudinally or rarely by an apical pore. **Ovary** superior, 3-locular; ovules (1)2–many in each locule; placentas axile, rarely basal if ovules 2(1) per locule (*Drimiopsis, Ledebouria*); style 1, terminating in a punctiform or sometimes distinctly 3-lobed stigma. **Fruit** a capsule, usually dehiscing loculicidally, occasionally septicidally. **Seeds** rounded to angular, small to large, mostly shiny black.

Genera ± 46, species ± 900; Africa, Eurasia and N America, widely distributed, but most richly represented in sthn Afr. and in a region from the Mediterranean to SW Asia; sthn Afr.: genera ± 27, species ± 400. A cautious approach has been taken towards generic delimitation in the family. Currently research projects are being undertaken on several key genera and a number of research publications are pending. Once these are available, with type, duplicate and cited material, then there should be greater clarity. Many genera in the Hyacinthaceae are much utilised in the horticultural trade and also in traditional medicine.

Borkhausen: 315 (1797); Dahlgren *et al.*: 188 (1985), Stedje: 1 (1996).

Liliaceae in part, Sölch *et al.*: 1 (1970); Dyer: 915 (1976).

Key to genera

1a Leaves rapidly deciduous; plants appearing leafless: inflorescence much branched (stem-like), erect, prostrate or climbing:
2a Infloresence erect or prostrate, wiry; withered perianth forming a cap on the developing capsule ..... **Schizobasis**
2b Infloresence usually climbing, fleshy; perianth persistent, remaining attached to base of capsule ..... **Bowiea**
1b Leaves present or developing after flowering; inflorescence not branched (except for one species in *Scilla*), either a spike or raceme, rarely a head-like cluster of flowers:
3a Bracts, at least the lower ones, spurred, sometimes falling early; withered perianth forming a cap on the developing capsule; seeds flattened, shiny, with a loose testa; leaf or leaves often developing after flowering; bulbs sometimes reddish, individual scales often visible:
4a Stamens exserted or filaments usually longer than 3 mm (if shorter then anther thecae always opening by longitudinal slits, not apical pores):
5a Leaves present at flowering, surrounded at base by elongate, membranous sheaths with raised transverse ridges; restricted to Namibia, Northern, Western and Eastern Cape ..... **Tenicroa**
5b Leaves usually developing after flowering, not surrounded at base by elongate, membranous sheaths with raised transverse ridges; not restricted to Namibia, Northern, Western and Eastern Cape:
6a Anther filaments forming a 'lantern' below, free above; flowers nocturnal ..... **Thuranthos**
6b Anther filaments free and spreading, or erect and connivent; flowers usually diurnal:
7a Tepals usually free or fused only near base, lobes usually spreading; stamens usually spreading ..... **Urginea**
7b Tepals usually fused, forming a tube, lobes usually strongly reflexed; stamens usually erect, connivent ..... **Drimia**
4b Stamens enclosed; filaments 0.5–2 mm long:
8a Flowers 1(or 2); tepals fused for three-quarters of their length; inflorescence 10–80 mm tall; species widespread... ..... **Litanthus**
8b Flowers 5–50; tepals fused for up to ± half their length; inflorescence 30–700 mm tall; restricted to Namibia, Free State, Northern, Western and Eastern Cape ..... **Rhadamanthus**
3b Bracts not spurred, usually persistent, sometimes minute or absent; perianth deciduous or persistent (not forming a cap on the developing capsule); seeds globose, angular or flat, testa firm; leaf or leaves present during flowering; bulbs never reddish, individual scales not clearly visible, bulb often covered with a tunic:
9a Flowers stellate or campanulate, not tubular; tepals free or fused near base:
10a Plants with 2 opposing, basal, ovate-orbicular, immaculate leaves; flowers green or whitish; restricted to Namibia, Northern and Western Cape ..... **Whiteheadia**
10b Plants with a variable number of leaves, if 2 opposing, basal and ovate leaves, then leaves always maculate (with spots or blotches) and flowers pinkish; distribution wider than above:
11a Inflorescence topped with a coma of green bracts ..... **Eucomis**
11b Inflorescence not as above:
12a Inner tepals erect, outer tepals spreading.... ..... **Albuca**
12b All tepals ± similar:
13a Inflorescence terminal, often erect; ovules axile, many; leaves immaculate:

14a Flowers usually blue, rarely pinkish or white, never yellow; bracts one or two per flower, decurrent ..... **Scilla**
14b Flowers white, yellow, orange, or green, never blue; bracts one per flower, not decurrent:
15a Stigma with three divergent branches; anther filaments connate at base; restricted to Namibia, Northern, Western and Eastern Cape ..... **Neopatersonia**
15b Stigma small and 3-lobed (but no divergent branches) or large and globose; anther filaments free; widespread ..... **Ornithogalum**
13b Inflorescence axillary, flexuose to suberect; ovules basal, 2 in each locule; leaves often maculate (with spots and blotches):
16a Tepals usually connivent, occasionally spreading, not reflexed; ovary sessile; not found in Namibia, Northern, Western and Eastern Cape ..... **Drimiopsis**
16b Tepals usually reflexed; ovary stipitate; widespread ..... **Ledebouria**
9b Flowers tubular:
17a Inflorescence a lax raceme, usually secund; flowers dull green or brown, sometimes yellowish or reddish, deciduous; tepals united at base, then connivent, with inner tepals connivent for longer than outer tepals (forming a short, extended tube), lobes spreading, 3 outer tepals usually tipped with a tail-like appendage, lobes cucullate; leaves 1–many, but never 2 opposing and basal ..... **Dipcadi**
17b Combination not as above:
18a Inflorescence (200–)300–1000 mm tall:
19a Perianth tube curved; old bulb scales breaking up into long coarse fibres; restricted to Namibia, Botswana, Northern Province ..... **Pseudogaltonia**
19b Perianth tube straight; old bulb scales not fibrous above; not restricted to Namibia, Botswana, Northern Province:
20a Leaves (3)4–many, never succulent or grass-like; inner and outer perianth lobes ± equal:
21a Flowers white, creamy yellow tinged green or pale green; capsule not inflated; restricted to Mpumalanga, Free State, KwaZulu-Natal, Lesotho and Eastern Cape ..... **Galtonia**
21b Flowers pink, red or yellow; capsule inflated; restricted to Western and Eastern Cape ..... **Veltheimia**
20b Leaves usually two or occasionally one or three, subsucculent, rarely many and grass-like; outer perianth lobes shorter than inner, rarely equal; restricted to Namibia, Free State, Northern, Western and Eastern Cape ..... **Lachenalia**
18b Inflorescence up to 100(–200) mm long:
22a Flowers all alike (occasionally upper vestigial); inflorescence a spike, raceme or capitate head:
23a Stamens in 2 whorls, filaments free ..... **Polyxena**
23b Stamens in 1 whorl, filaments fused or occasionally free:
24a Inflorescence a spike, raceme or rarely a capitate head; upper flowers of spike or raceme vestigial; outer perianth lobes shorter than inner, rarely equal ..... **Lachenalia**
24b Inflorescence forming a capitate head; all flowers developed; outer and inner perianth lobes ± equal:
25a Anther filaments free or fused, forming a tube up to 3 mm long ..... **Massonia**
25b Anther filaments connate, forming a tube at least 10 mm long:
26a Perianth lobes ± 12 mm long; anther filaments arising from mouth of perianth tube; capsule obtriangular, apex retuse ..... **Androsiphon**
26b Perianth lobes ± 2 mm long; anther filaments arising ± halfway up perianth tube; capsule ovoid, with a long beak-like apex ..... **Amphisiphon**
22b Flowers of two types: outer or lower flowers irregular; inner or apical flowers ± regular; inflorescence capitate, or if a spike or raceme, shorter than 90 mm:
27a Flowers pale yellow; ± 40–60 flowers per spike ..... **Neobakeria**
27b Flowers red, orange or bright yellow; ± 10 flowers per head ..... **Daubenya**

Albuca L. 1079000

Linnaeus: 438 (1762); Baker: 451 (1897); Sölch *et al.*: 5 (1970); Knudtzon & Stedje: 773 (1986); Müller-Doblies: 365 (1994); Hutchings *et al.*: 38 (1996); Stedje: 21 (1996).

Perennial, small to large, deciduous or rarely evergreen, bulbous herbs, occasionally forming clumps. **Bulb** globose or globose-depressed; outer tunics enveloping inner or imbricate, membranous or often fibrous at tip. **Leaves** 1–many; usually contemporary with flowers, sometimes developing after flowering; terete, linear to lorate, occasionally spirally twisted, apex acute to acuminate, glabrous, hairy or glandular-pubescent; with a tubular basal sheath. **Inflorescence** a raceme of few to many flowers; peduncle naked, firm, cylindrical; bracts lanceolate to ovate-acuminate. **Flowers** white or yellow with broad green keels, erect or nodding, sometimes sweetly scented; pedicels short or long. **Tepals** free, persistent, oblong; outer tepals spreading, inner tepals connivent, rarely spreading, enclosing stamens and gynoecium, hooded at apex. **Stamens** 3 + 3, or occasionally 3 inner fertile and 3 outer sterile with anthers not fully formed or absent; filaments terete or winged and expanded below; anthers versatile, introrse. **Ovary** oblong, often angled, ovules many; style cylindrical or narrowly obpyramidal with the angles scabrid; stigma apical, capitate or conical or with 3 deltoid fimbriate lobes. **Fruit** an ovoid to globose capsule, 3-angled, dehiscing loculicidally (septa also tear apart in some species). **Seeds** flat, semicircular, black, shiny, papillate. $x = 9$ (polyploidy).

Species ± 80, mostly in sthn Afr. but extending to Arabian Peninsula: ± 60 in sthn Afr., in all countries and provinces. Many species have very restricted distributions. Habitat ranges from sandy soils to rocky outcrops, grassland to thornveld. The broad greenish keels of the flowers often fade to a characteristic orange-brown colour, a similar colour to that of the capsules. Several species are in the horticultural trade and several are used medicinally.

Amphisiphon W.F.Barker 1101020

Barker: 19 (1936); Jessop: 432 (1976); Brandham: 58, t. 123 (1989).

Perennial, dwarf, deciduous bulbous herbs. **Bulb** globose, with outer covering of thin, brown tunics. **Leaves** 2(3), contemporary with flowers, spreading, ovate; bases enfolding peduncle; dark green. **Inflorescence** a congested raceme forming a capitate head of several to

many flowers; peduncle short; bracts small. **Flowers** yellow to yellowish green above, white below, regular; sweetly scented; pedicels short. **Tepals** fused for most of their length, forming a tube; lobes erect, very short. **Stamens** 6, in one whorl, arising below middle of perianth tube, exserted from perianth; filaments fused for ± two-thirds of their length, free portion bright yellow, erect-spreading; anthers yellow, dorsifixed, introrse. **Ovary** narrowly ovoid; ovules many; style yellow, subulate; stigma minute, apical. **Fruit** an ovoid-acuminate capsule, roundly angled, membranous, dehiscing septicidally; style persistent. **Seeds** globose, shiny black. $x = 8$ (1 report, polyploidy).

Species 1, *Amphisiphon stylosa* W.F.Barker, sthn Afr., Northern Cape, endemic to Calvinia District. Flowering in June.

Androsiphon Schltr. 1101010

Schlechter: 147 (1924); Barker: 21 (1936); Jessop: 432 (1976); Brandham: 124, t. 155 (1990).

Perennial, dwarf, deciduous, bulbous herbs. **Bulb** globose, with outer covering of thin, brown tunics. **Leaves** 2, contemporary with flowers, spreading, ovate, glabrous, dark green, sometimes with darker green spots. **Inflorescence** a capitate head, situated between the leaves; peduncle terete, lengthening in fruit; bracts small and linear. **Flowers** golden yellow, regular; pedicels long, firm, recurved in fruit. **Tepals** fused below forming a tube; lobes erect or erect-spreading, linear-oblong, somewhat longer than tube. **Stamens** 6, in one whorl, longer than tepals; filaments fused, forming a long, cylindrical tube arising from mouth of perianth tube, top of filament tube forming a disc through which the style emerges, free portion of filaments erect-spreading; anthers versatile, introrse. **Ovary** narrowly ovoid; ovules 8–15 per locule; style terete; stigma small, apical. **Fruit** an obtriangular capsule, valves lengthened above into notched, attenuated transparent wings; dehiscing loculicidally. **Seeds** globose, black, smooth. $x = 8$ (1 report, polyploidy).

Species 1: *Androsiphon capensis* Schltr., Northern Cape, endemic to Calvinia District. Flowering recorded in June, August and September.

Bowiea Harv. ex Hook.f. 1011000

Hooker: t. 5619 (1867); Baker: 367 (1896); Mildbraed: 201 (1934); Sölch *et al.*: 32 (1970); Dyer: t. 815 (1941); Jessop: 312 (1977); Van Jaarsveld: 343 (1983); Bruyns & Vosa: 287 (1987); Reid *et al.*: t. 2007 (1990); Stedje: 28 (1996); name conserved, not of Haworth.

Perennial, deciduous, glabrous, bulbous herbs. **Bulb** subglobose to globose-depressed, up to 150 mm in diameter, usually exposed above ground; with or without grey, withered, membranous outer scales, inner scales thick, white or green if exposed to light. **Leaves** 1–few, soon withering and falling, linear, small, canaliculate. **Inflorescence**: axis (stem) much branched, succulent, scrambling or pendulous, up to 2–3 m long, annual, glabrous, bright green or glaucous, branches reflexed-spreading; bracts narrowly triangular or lanceolate, spurred. **Flowers** green, yellowish green or white, diurnal; pedicels long, arched. **Tepals** free or fused only at base; lobes spreading or reflexed, oblong to lanceolate with incurved tips, persistent in fruit. **Stamens** 6, arising from base of tepals; filaments free; anthers oblong, introrse. **Ovary** subglobose to conical; ovules many; style terete, with a clavate, 3-lobed stigma. **Fruit** a globose or ovoid capsule, trigonous; valves emarginate or tapering into style, with or without a little horn above middle of each valve; dehiscing loculicidally. **Seeds** few, flattened, shiny black. $x = 10$.

Species ± 3, Africa, from South Africa to Uganda and Kenya; 2 in sthn Afr., widespread but increasingly rare, Namibia, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Northern, Western and Eastern Cape. Regarded by some authorities (Bruyns & Vosa 1987) as a monospecific genus. Most frequently found among bushes and trees, especially along river banks, it also occurs in drier areas, usually among boulders, but sometimes in the open. The photosynthetic function is performed by the inflorescence as the leaves are rudimentary and soon withering. Well known as a medicinal plant, toxic in large quantities. Cultivated ornamental.

Daubenya Lindl. 1102000

Lindley: t. 1813 (1835); Baker: 394 (1871); Baker: 417 (1897); Marloth: t. 71 (1922); Hall: 13 (1970); Jessop: 431 (1976); Lavranos & Craib: 22 (1997); Müller-Doblies & Müller-Doblies: 91 (1997).

Perennial, dwarf, bulbous herbs. **Bulb** subglobose, deep-seated, with outer covering of thin, brown tunics. **Leaves** 2, contemporary with flowers, flat on ground, glabrous, acute, often brownish towards apex, bases enfolding peduncle; veins conspicuously sunken. **Inflorescence** a showy, capitate head of ± 10 flowers, situated between the leaves; peduncle short, exserted in fruit; bracts large, obovate, membranous, clasping pedicels and flower bases. **Flowers** brilliant red, orange or yellow (or red streaks on yellow), unusual scent; pedicillate; dimorphous: outer flowers strongly irregular with tepals fused below, forming a tube, extended on abaxial side, 3 abaxial tepal lobes large, spatulate, 3 inner lobes reduced; inner flowers ± regular with tepals fused below, forming a long tube, tepal lobes short. **Stamens** 6; outer flowers with filaments free on abaxial side, basally connate on adaxial side; inner flowers with filaments basally connate, free portion tapering; anthers oblong, versatile, introrse. **Ovary** ovoid; ovules many; style tapering; stigma minute, apical. **Fruit** a triangular capsule, shortly fusiform, apiculate, membranous, not winged. **Seeds** globose, black, smooth, shiny.

Species 1: *Daubenya aurea* Lindl., Northern Cape, endemic to Sutherland District. Found on red clay soils.

Dipcadi Medik. 1084000

Medikus: 431 (1790); Baker: 445 (1897); Obermeyer: 117 (1964); Sölch *et al.*: 38 (1970); Stedje: 2 (1996).

Perennial, deciduous, small, bulbous herbs. **Bulb** ovoid to globose, sometimes forming a neck, firm; outer tunics thin; occasionally forming runners or bulbils; roots many, thin. **Leaves** 1–many, usually contemporary with flowers; basal; straight or spirally twisted; linear to lorate; apex acute to acuminate; base free or folded and clasping; margin smooth, undulate, ciliate or papillate; glabrous or hairy. **Inflorescence** a raceme, with few to many flowers, often secund; peduncle terete or ribbed and papillate, rachis drooping in bud becoming erect during anthesis; bracts small, falling early or persistent. **Flowers** yellow-green, green, reddish brown or brown; pedicels short to long, recurved but erect in fruit. **Tepals** fused below, forming a tube, connivent above; lobes of 3 outer tepals usually spreading, apex cucullate, sometimes with a tail-like appendage; lobes of 3 inner tepals similar to outer but spreading only at their tips and without appendages; deciduous. **Stamens** 6, included, just reaching mouth of perianth tube, uniform; filaments flat, fused to perianth tube, connivent above; anthers dorsifixed, introrse. **Ovary** sessile or shortly stipitate, ovoid, rarely with 3 apical knobs; with ± 20, biseriate ovules; style short or long, papillate; stigma 3-lobed or capitate. **Fruit** an ovoid capsule, rarely 3-umbonate, rarely stipitate; **Seeds** flat, round, black, shiny, papillate. $x = 4$ (3, 5) (high polyploidy).

Species ± 30, Africa to Madagascar, Socotra, Mediterranean region and India; 14 in sthn Afr., in all countries and provinces. Occurs in stony or sandy flats, rocky habitats and grassland. Some species are poisonous to cattle and sheep, some are used medicinally and others are reported to be edible.

Drimia Jacq. 1082000

Jacquin: 38 (1796); Willdenow: 165 (1799); Baker: 436 (1897); Jessop: 269 (1977) in part; Deb & Dasgupta: 819 (1982); Hutchings *et al.*: 40 (1996); Stedje: 15 (1996) in part; Goldblatt & Manning (in prep.).

Perennial, deciduous, small to large bulbous herbs, sometimes forming clumps. **Bulb** ovoid to globose, scales loose, imbricate or occasionally outer enveloping inner, usually reddish; roots firm, often swollen and branched. **Leaves** 1–15, usually developing after flowering; terete, linear to lorate; glabrous or hairy; margin entire or crisped. **Inflorescence** a cylindrical or subcapitate raceme, often tall, usually dense and many-flowered; peduncle erect, cylindrical; bracts membranous, short or long, often protruding far beyond upper buds, persistent, at least lower ones spurred. **Flowers** white, pink, yellowish to greenish brown or purple, often tinged silver or bronze, usually with darker keels; facing sideways or pendulous. **Tepals** fused below, forming a tube near base; lobes usually reflexed, usually longer than tube; deciduous, cohering above when withered, circumscissile below. **Stamens** 6, arising from base of perianth tube; filaments erect and somewhat connivent or spreading, terete, smooth or rough; anthers versatile, opening by longitudinal slits. **Ovary** ovoid, obtuse; ovules many; style terete, ultimately exserted; stigma small, apical. **Fruit** an oblong-globose to globose capsule, triangular; dehiscing loculicidally. **Seeds** flat, ovate, dark, shiny. $x = 10$ (9) (polyploidy).

Species ± 13, sthn Afr., Northern Province, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape. *Drimia* is viewed in its strict sense and does not include genera such as *Urginea*, *Thuranthos* and *Tenicroa* (see Jessop 1976) or *Urginea*, *Rhadamanthus*, *Tenicroa*, *Schizobasis* and *Litanthus* (see Goldblatt & Manning in prep.). Varied habitat, but most frequent in open grassland, sometimes amongst rocks, occasionally in marshy ground. Used in traditional medicine and protective charm mixes.

Drimiopsis Lindl. & Paxton 1090000

Lindley & Paxton: 73, t. 172 (1851); Baker: 473 (1897); Jessop: 151 (1972); Stedje: 45 (1993); Stedje: 6 (1996); Hutchings *et al.*: 42 (1996); Müller-Doblies & Müller-Doblies: 58 (1997).

Resnova Van der Merwe: 41 (1946).

Perennial, deciduous, bulbous herbs, occasionally forming clumps. **Bulb** globose to ovoid; scales imbricate, fleshy. **Leaves** 1–several, contemporary with flowers; with or without a pseudopetiole; narrowly ovate to cordate, thin or fleshy, acute; folded and clasping below; margin entire, rarely minutely crenate; often spotted; glabrous or pubescent. **Inflorescence** 1–several, an axillary, cylindrical raceme(s) or spike(s); peduncle erect; bracts minute. **Flowers** green, white, pink or purple, small, many; pedicels very short or absent. **Tepals** free, cohering below, forming a tube; lobes erect, with small spreading or incurved, hooded apices, narrowly oblong; persistent. **Stamens** 6, arising from base of tepals, included; anthers versatile, introrse. **Ovary** sessile, oblong, with 2 basal ovules in each locule; style terete; stigma apical. **Fruit** an obovoid capsule, deeply 3-angled, rounded above; dehiscing loculicidally. **Seeds** semiglobose, flat on abaxial side, black, shiny, verrucose. $x = 10$, 11 (aneuploids, high polyploidy).

Species ± 15, Africa; 5 in sthn Afr., widespread in eastern region, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal, Eastern Cape. In this account, the concept of *Drimiopsis* includes that of the genus *Resnova*. This differs from Müller-Doblies & Müller-Doblies (1997) where the genus *Resnova* is resuscitated and is separated from *Drimiopsis* by its ± spreading tepal lobes, biseriate stamens, subulate filaments and longer perianth. Several new species of *Drimiopsis* were also described in this publication, but before these can be incorporated type material/cited material needs to be accessible. *Drimiopsis*, in its broad sense, occurs in grassland, forest margins, often in rocky, shady areas. Used medicinally and horticulturally.

Eucomis L'Hér. 1088000

L'Héritier: 17 , t. 18 (1789); Baker: 475 (1897); Reyneke (1972); Pooley: 98, 512 (1998); D. Govender pers. com.

Perennial, solitary or gregarious, bulbous herbs. **Bulb** globose to ovoid, usually large, outer tunics usually dark and membranous; roots many. **Leaves** several to many, contemporary with flowers; lorate to obovate; base channelled; smooth, shiny; green, occasionally with purple spots and/or stripes, occasionally suffused with purple. **Inflorescence** a raceme of many flowers, topped with a coma of green, leafy, sterile bracts (rarely fertile); peduncle cylindrical or club-shaped; fertile bracts smaller than coma bracts. **Flowers** white, cream, greenish or wine-red, sometimes pungently scented; pedicels short to long. **Tepals** fused at base; lobes spreading, oblong or oblanceolate-oblong, persistent. **Stamens** 6, arising near base of perianth; filaments fused below to form a shallow cup, deltoid; anthers versatile, introrse. **Ovary** rounded to obovoid, nectariferous above; ovules many in each locule; style tapering; stigma small, apical. **Fruit** a 3-angled capsule, inflated and membranous or dry, hard and compact. **Seeds** globose or ovoid, black, brown or hard. $x = 10$ (aneuploids, polyploidy).

Species ± 11, South Africa to Zimbabwe and Malawi; ± 10 in sthn Afr., Botswana, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape. Widespread but absent from drier areas. Found in grassland, forest, swamps and along river banks, from coast to mountainous areas of the interior. Used in traditional medicine. Unusual and beautiful garden plants. The common name 'pineapple lily' is derived from the coma-topped raceme, which resembles a pineapple.

Galtonia Decne. 1081000

Decaisne: 32 (1880); Baker: 450 (1897); Verdoorn: t. 1188 (1955); Hilliard & Burtt: 95 (1988); Pooley: 96 (1998).

Perennial, large, glabrous, showy bulbous herbs. **Bulb** ovoid to globose. **Leaves** 3–8, basal, lorate to elliptic, somewhat succulent, firm or flaccid. **Inflorescence** usually a solitary, tall, many-flowered raceme; peduncle erect, cylindrical; bracts large, lanceolate, acuminate, membranous. **Flowers** white, creamy yellow tinged green or pale green, bell-shaped, fairly large, pendulous, faintly scented; pedicels spreading, long. **Tepals** fused below forming a tube; lobes narrowly to widely spreading, longer or shorter than tube; persistent, splitting down one side to accommodate the enlarging capsule. **Stamens** 6, in two whorls, arising from perianth tube, included; filaments terete to flat; anthers versatile, introrse. **Ovary** cylindric to ovoid; ovules many; style terete; stigma capitate, 3-lobed, papillose. **Fruit** a cylindric or elongate-conical capsule, 3-angled, membranous, dehiscing loculicidally. **Seeds** half moon-shaped, compressed, narrowly winged or angled, black, shiny. $x = 11$ (1 report).

Species 4, sthn Afr., Mpumalanga, Free State, KwaZulu-Natal, Lesotho, Eastern Cape. Found in marshy or somewhat drier ground, grasslands, forest margins, wet cliffs. Cultivated in England since 1862.

Lachenalia J.Jacq. ex Murray 1098000

Murray: 314 (1784); Baker: 421 (1897); Sölch *et al.*: 53 (1970); Barker: 391 (1978); Barker: 193 (1979); Barker: 423 (1983); Barker: 535 (1984); Barker: 166 (1987); Duncan: 1 (1988); Barker: 630 (1989); Duncan: 1 (1996); Duncan: 7 (1997), Duncan: 40 (1998).

Perennial, bulbous herbs. **Bulb** variable in size, outer covering of soft or hard, dry, membranous tunics; occasionally forming a neck, sometimes bulbilliferous. **Leaves** 1–many (usually 2); contemporary with flowers or occasionally developing before or after flowering; erect to spreading or ± flat on ground; linear, ovate to

oblong; often funnelform or tubular below; margin entire, occasionally undulate; smooth, hairy or pustulate; often maculate and/or with transverse stripes. **Inflorescence** a raceme or spike of many flowers, upper flowers vestigial; peduncle cylindrical or sometimes swollen, clavate, sometimes spotted; bracts various, often broad and membranous. **Flowers** variously coloured, white, yellow, orange, red, blue, purple or green; usually irregular, erect or pendulous, long and tubular to small and campanulate; pedicels long, short or absent. **Tepals** fused near base, lobes spreading or cohering and forming a tube; inner tepals usually much longer than outer tepals; outer tepals usually with a swelling or gibbosity near the apex; persistent. **Stamens** 6, in one whorl, arising from base of perianth, included or protruding; filaments filiform; anthers versatile, introrse. **Ovary** ovoid; ovules few to many per locule; style long or occasionally short, terete; stigma minutely capitate. **Fruit** an ovoid to oblong capsule, trigonous, membranous; dehiscing loculicidally. **Seeds** globose, black, variable in size and texture; arillode various, large and swollen or ribbed, grading to small and inconspicuous. $x = 7, 8$ (5, 9, 11, 13) (polyploidy).

Species ± 110, sthn Afr., Namibia, Free State, Northern, Western and Eastern Cape. Largest genus of Hyacinthaceae in sthn Afr. with several species only known from a single locality. Occurs in a wide range of habitats. Cultivated ornamental with many cultivars and hybrids, some of which have been in cultivation for over 200 years.

Ledebouria Roth 1090010

Roth: 194 (1821); Jessop: 233 (1970); Baker: 478 (1897) as *Scilla* L., subgenus *Ledebouria*; Sölch *et al.*: 66 (1970); Stedje: 10 (1996); Stedje: 1 (1998); Venter & Edwards: 15 (1998a); Venter & Edwards: 179 (1998b).

Perennial, deciduous, usually solitary, bulbous herbs. **Bulb** globose, ovoid, obovoid or oblong, usually below ground; scales membranous to fleshy, never fibrous; roots fleshy, fusiform or contractile. **Leaves** 1–many, usually contemporary with flowers; spreading to erect or flat on ground; linear to ovate-acuminate or spatulate; usually glabrous, but sometimes pitted, viscid or hairy; margin entire; often with purplish or dark green spots or stripes. **Inflorescence** 1–several, axillary raceme(s) of few to many flowers, erect or usually spreading horizontally; bracts small, filiform, usually each with a small lateral bracteole. **Flowers** small, pink, pink-purple or white, often with greenish keels; pedicels spreading or drooping, short or long, often decurrent. **Tepals** fused at base forming a wide, shallow cup; oblong to ovate, with lobes spreading or recurved; persistent. **Stamens** 6, arising from perianth base; filaments free, erect, terete; anthers versatile, introrse. **Ovary** stipitate, conical or obconical, sometimes with a crenate base, 3- or 6-lobed; ovules 2 in each locule, basal; style terete; stigma apical. **Fruit** an ovoid to subglobose capsule, 3-angled; dehiscing loculicidally. **Seeds** obovoid, reddish or yellowish brown, brown or black, shiny. $x = 10$ (aneuploids, polyploidy).

Species ± 46, across Africa to southern tip of India; 38 in sthn Afr., in all countries and provinces. Used medicinally and as traditional charms. Occasionally used in the horticultural trade.

Litanthus Harv. 1085000

Harvey: 314 (1844); Baker: 444 (1897); Jessop: 307 (1977); Bruyns & Vosa: 295 (1987); Hilliard: 30 (1990).

Perennial, deciduous, very small, bulbous herbs. **Bulb** globose to ovoid, scales white, compact; roots many, thin, villous. **Leaves** few; developing after flowering; filiform. **Inflorescence** of 1 (or 2) flowers, subtended by 2 opposing, spurred bracts; peduncle erect, simple and filiform. **Flower(s)** white or rarely pale pink, nodding, tubular; pedicel(s) recurved. **Tepals** fused, forming a cylindric tube with short, rounded lobes. **Stamens** 6, in one whorl, arising from apex of perianth tube; filaments very short or absent; anthers with a shortly extended emarginate connective, introrse, opening by longitudinal slits. **Ovary** ovoid; ovules many; style terete; stigma apical. **Fruit** an ovoid capsule, membranous; dehiscing loculicidally. **Seeds** tetrahedral, pointed, black, papillose. $x = 10$ (1 report).

Species 1: *Litanthus pusillus* Harv., sthn Afr., widespread: Botswana, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape. Occurs most frequently massed in rock crevices, often on the top of boulders, in soil or moss cushions. This minute plant with its dainty leaves and peduncle has not often been recorded.

Massonia Thunb. ex Houtt. 1101000

Houttuyn: 424, t. 85 (1780); Baker: 408 (1897); Merrill: 331 (1938); Obermeyer: t. 1451 (1965b); Merxmüller & Roessler: 83 (1973); Jessop: 406 (1976); Hilliard: 35 (1990); Müller-Doblies & Müller-Doblies: 66 (1997); Goldblatt & Manning (in prep.).

Perennial, small, deciduous, bulbous herbs. **Bulb** subglobose, ovoid-ellipsoid or flattened at base and apex; outer covering of thin, membranous, brown tunics, inner scales fleshy, cataphyll tubular and membranous. **Leaves** 2, contemporary with flowers; often flat on ground or spreading; usually broadly obovate, ovate or orbicular; folded at base; veins conspicuously sunken; glabrous or hairy, pustulate or echinulate; sometimes maculate. **Inflorescence** a condensed subcorymb or subcapitate raceme of few to many flowers, close to ground level; peduncle short, tapered; outer bracts large and sterile, inner bracts much smaller and fertile. **Flowers** usually white or pink, occasionally greenish, occasionally with conspicuous orange filaments; regular; often fragrant; pedicels short. **Tepals** fused below, forming a tube, usually long and narrow; lobes linear, erect or spreading to reflexed, sometimes with a double fold at base; withering but persistent. **Stamens** 6, in one whorl, prominent, arising from mouth of perianth tube; filaments free or fused, forming a basal cup or swollen disk; anthers oblong to linear, versatile. **Ovary** globose to obtriangular; ovules few to many; style tapering; stigma small, apical. **Fruit** an obtriangular capsule, winged or deeply lobed, thin-walled; dehiscing loculicidally. **Seeds** globose, black, reticulate or verrucose.

Species ± 8, sthn Afr., Namibia, North-West, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

This concept of *Massonia* includes 5 species detailed by Reid (1993) plus three species previously included under *Neobakeria* (following Müller-Doblies & Müller-Doblies, 1997). It is different to Goldblatt & Manning (in prep.) who have taken a broad view of *Massonia* and included *Neobakeria*, *Androsiphon*, *Amphisiphon* and *Daubenya*. It does not include the 4 reinstated species and 1 new species described by Müller-Doblies & Müller-Doblies (1997). The latter also described a closely related, monospecific genus, *Namophila* D.Müll.-Doblies & U.Müll.-Doblies, endemic to Namibia. *Massonia* is widespread in dry areas, often on clay or sandy flats or rocky slopes.

Neobakeria Schltr. 1099010

Schlechter: 149 (1924); Jessop: 406 (1976) under *Massonia*; Müller-Doblies & Müller-Doblies: 86 (1997).

Perennial, dwarf, bulbous herbs. **Bulb** globose or ovoid, usually deep-seated, covered with a few outer, brown membranous tunics, inner scales whitish. **Leaves** 2; contemporary with flowers; ± flat on ground or erect-spreading; ovate to ovate-acuminate; usually with several to many sunken veins; glabrous or pustulate. **Inflorescence** a spike or raceme of few to many flowers; lower bracts ovate to obovate, membranous, small. **Flowers** white or pink, dimorphous: basal flowers ir-

regular with tepals fused below forming a tube, extended on adaxial side; tepal lobes linear; uppermost flowers regular with tepals fused below forming a tube, tepal lobes ovate to ovate-acuminate. **Stamens** 6, protruding; basal flowers with filaments on adaxial side basally connate, on abaxial side free; uppermost flowers with filaments basally connate; anthers versatile, introrse. **Ovary** narrowly ovoid; ovules few to several; style tapering; stigma small, apical. **Fruit** a narrowly ovoid capsule, membranous; dehiscing loculicidally. **Seeds** globose, black.

Species 1: *Neobakeria namaquensis* Schltr., Northern Cape. Following Müller-Doblies & Müller-Doblies (1997), other species previously placed under *Neobakeria* (see Reid, 1993) are placed under *Massonia*.

Neopatersonia Schonland 1089020

Schonland 251: (1912); Lewis: 6 (1952); Sölch *et al.*: 54 (1970); Bond & Goldblatt: 54 (1984).

Perennial, bulbous herbs. **Bulb** small, ovoid, occasionally forming a neck. **Leaves** 1–3; erect or spreading; linear, lanceolate or falcate. **Inflorescence** a raceme of few to many flowers; peduncle tapered, naked; bracts ovate to lanceolate, membranous or slightly fleshy. **Flowers** white or pale green; spreading-reflexed; pedicels spreading or erect-spreading. **Tepals** fused at base; lobes spreading or reflexed; persistent. **Stamens** 6, fused to perianth; filaments deltoid, connate at base, free portion subulate and curved; anthers versatile, introrse. **Ovary** ovoid; ovules few to many; style terete, with 3 horizontal or deflexed stigmatic branches. **Fruit** an ovoid, membranous capsule; style persistent. **Seeds** few to many, flask-shaped, black, smooth or verrucose.

Species 3, sthn Afr., Namibia, Northern, Western and Eastern Cape.

Ornithogalum L. 1089000

Linnaeus 306 (1753); Baker: 494 (1897); Leighton: 83 (1944a); Sölch *et al.*: 55 (1970); Obermeyer: 323 (1976); Müller-Doblies & Müller-Doblies: 361 (1996).

Elsiea F.M.Leight.: 55 (1944b).

Perennial, usually deciduous, solitary or gregarious, bulbous herbs. **Bulb** usually below ground, occasionally poorly developed in wet habitats, scales sometimes extended into a neck; bulbilliferous. **Leaves** 1–many; developing before flowering or contemporary with flowers; erect or spreading; rosulate or in two ranks; filiform to oblong; usually acute to acuminate; margin smooth, ciliate, fimbriate or muricate; glabrous or hairy; a few species surrounded basally by tubular cataphylls. **Inflorescence** a raceme of many to few flowers, rarely a corymb; peduncle erect, curved or with knee-like bend; bracts large to small, various, persistent, often prominent. **Flowers** white, green, yellow, orange, red or buff, with or without a green or dark central, dorsal stripe; large and showy to small; scented or not; pedicels short to long. **Tepals** free or rarely fused at base, in two subequal whorls; lobes cucullate with minute stipitate glands, ovate to oblong, inner lobes slightly larger, spreading at least at anthesis. **Stamens** 6, in two whorls, usually subequal, arising from base of perianth; filaments free, filiform to ovate-acuminate, or with variously shaped lateral expansions; anthers versatile, introrse. **Ovary** sessile or stipitate, ovoid or globose; ovules few to many; style absent or terete, erect or deflexed; stigma small, 3-lobed to large, globose and glandular-stipitate, apical. **Fruit** a globose to deeply 3-angled and prominently ribbed capsule, transparent or leathery. **Seeds** variously shaped, minute to large and discoid, black, shiny, smooth, papillate or with various ridges or protrusions. $x = 4, 6, 7$ (aneuploids, high polyploidy).

Species ± 200, Africa, Europe and W Asia; ± 70 in sthn Afr., all countries and provinces, especially in SWestern Cape.

Habitat varies from dry, karroid areas to marshes, riverbanks and alpine localities. Several species are known to be extremely poisonous. Used as a traditional, protective charm. Well known by its vernacular names Chinkerinchees, Tjienks or Tjienkerintjies. Several species have long been important in the horticultural trade. The work by Müller-Doblies & Müller-Doblies (1996) has not yet been incorporated by South African herbaria. In this work they describe 40 new species and reinstate another 26 species.

Polyxena Kunth 1099000

Kunth: 294 (1843); Baker: 418 (1897) in part, excluding subgenus *Astemma* Baker; Schonland: 443 (1910); Jessop: 426 (1976); Mathew: 5 (1988); Müller-Doblies & Müller-Doblies: 83 (1997); Goldblatt & Manning (in prep.).

Periboea Kunth: 292 (1843). *Hyacinthus* L.: 316 (1753) in part.

Perennial, dwarf, deciduous, bulbous herbs. **Bulb** subglobose, globose to ovoid; outer tunics brown and membranous, inner scales white and fleshy; cataphyll tubular and membranous. **Leaves** 2–6, opposing; spreading above; ovate to linear, canaliculate; acute to obtuse; often with conspicuous, sunken veins; glabrous. **Inflorescence** a raceme or subcorymb of many flowers, just exserted above ground level between leaves; peduncle elongating in fruit; bracts small, membranous. **Flowers** pink, mauve or white; regular; scented; pedicels short. **Tepals** fused below forming a short or long narrow tube; lobes spreading. **Stamens** 6, in two whorls, arising from perianth tube; filaments free; anthers oblong to linear, yellow or dark, versatile, introrse. **Ovary** ovoid; ovules several per locule; style terete; stigma small, apical. **Fruit** a rounded, membranous capsule; dehiscing loculicidally. **Seeds** subglobose to globose, black.

Species 5, sthn Afr., Free State, Northern, Western and Eastern Cape. This five-species concept of *Polyxena* follows Goldblatt & Manning (in prep.), not the two-species concept of Jessop (1976). It includes *P. corymbosa*, unlike Müller-Doblies & Müller-Doblies (1997) who placed this and another species of *Polyxena* under the reinstated genus *Periboea*. They also described a new species of *Periboea* and one new species of *Polyxena*. *Polyxena* usually occurs in seasonally moist clay or on loamy flats.

Pseudogaltonia (Kuntze) Engl. 1094000

Kuntze: 274 (1886); Engler: 158 (1888); Baker: 451 (1897) under *Galtonia*; Sölch *et al.*: 63 (1970); Burtt: 485 (1998).

Lindneria T.Durand & Lubbers: 216 (1889); Speta: 123 (1985).

Perennial, bulbous herbs. **Bulb** large, scales breaking up into long, coarse fibres; caudex small. **Leaves** 6–10, contemporary with flowers; erect; margin entire; soft; glaucous green, broadly linear-acuminate; glabrous. **Inflorescence** a subcapitate to somewhat elongated raceme, much overtopping leaves; bracts linear-acuminate, membranous, each with a small lateral bracteole. **Flowers** pale glaucous green; pendulous; pedicels long. **Tepals** fused below forming a slightly curved cylindric tube; lobes spreading, ovate, obtuse, about half as long as tube; semipersistent. **Stamens** 6, arising from throat of tube, just exserted; filaments deltoid, flat; anthers versatile, introrse. **Ovary** ovoid; ovules many; style terete; stigma small, apical. **Fruit** an obtusely ovoid capsule; dehiscing loculicidally. **Seeds** rounded, flattish, shiny black. $x = 8$ or 12 (1 report each).

Species 1: *Pseudogaltonia clavata* (Mast.) E.Phillips; sthn Afr., Namibia, Botswana, Northern Province.

Rhadamanthus Salisb. 1083000

Salisbury: 37 (1866); Baker: 444 (1897); Nordenstam:155 (1970); Sölch *et al.*: 64 (1970); Obermeyer: 137 (1980b); Bond & Goldblatt: 56 (1984); Snijman, Manning & Goldblatt: 111 (1999); Goldblatt & Manning (in prep.).

Perennial, deciduous, small to medium, bulbous herbs. **Bulb** globose to ovoid; scales loose, imbricate, occa-

sionally spatulate, occasionally produced apically into thin, transversely costate sheaths; roots several, fibrous. **Leaves** 1–many; developing after flowering; erect or spreading; filiform to linear or ovate-oblong; glabrous or pubescent. **Inflorescence** a few- to many-flowered raceme, occasionally secund; peduncle erect, cylindrical, smooth or with scabrid ribs; bracts small, spurred. **Flowers** white, pink, green or brown, with darker keels; small; usually nodding; campanulate; pedicels short to long, recurved, but erect in fruit. **Tepals** subequal, usually fused below, rarely free, spreading or incurved. **Stamens** 6, enclosed; filaments arising from base of tepals; anthers sometimes connivent, occasionally caudate, glabrous or barbellate, usually dehiscing by an apical pore or occasionally by an incomplete or complete longitudinal slit. **Ovary** globose to ovoid, glabrous or papillate-puberulous; ovules several per locule; style short and thick, cylindrical or absent; stigma small, apical. **Fruit** a globose to ovoid capsule, 3-angled; dehiscing loculicidally. **Seeds** few to many, round, flat, black, shiny, finely reticulate-rugose. $x = 10$.

Species 12, sthn Afr., arid regions of western sthn Afr. or the montane regions of the south: Namibia, Free State, Northern, Western and Eastern Cape. Closely related to *Urginea*, usually differing in the mode of anther dehiscence.

Schizobasis Baker 1010000

Baker: 105 (1873); Baker: 367 (1896); Baker: 469 (1898); Sölch *et al.*: 65 (1970); Jessop: 309 (1977); Bruyns & Vosa: 295 (1987); Hutchings *et al.*: 29 (1996); Stedje: 28 (1996); Retief & Herman: 105 (1997).

Perennial, deciduous, bulbous herbs. **Bulb** globose to ovoid, occasionally forming a neck, usually with membranous outer scales, fleshy, white, pink, yellowish or greenish inner scales. **Leaf** 1(2); narrowly linear; present only on young bulbs, soon withering and falling. **Inflorescence** intricately branched or branches fastigiate, erect or scrambling, up to 500 mm long, wiry, green, persisting until end of flowering season, minute grey hairs present near base; bracts small, membranous, spurred. **Flowers** white or pale yellow to pale pink, with or without greenish or brown keels; small; nocturnal; pedicels resembling inflorescence branchlets. **Tepals** fused basally, somewhat spreading, deciduous; cohering above when wilted, circumscissile below, forming a cap on the developing capsule. **Stamens** 6, arising from base of tepals, shorter than tepals; filaments free; anthers oblong, dorsifixed, versatile, introrse. **Ovary** globose to ovoid, with 4–8 ovules in each locule; style terete; stigma apical. **Fruit** a small, globose to ovoid capsule, trigonous, membranous; dehiscing loculicidally. **Seeds** 1–3 per locule, semiglobose, black, shiny. $x = 10$.

Species 1(–5), Africa, from South Africa to Ethiopia; widespread but rare, all countries (except Lesotho) and all provinces. Uncertainty regarding precise number of species. Occurs in grassland, woodland and semidesert, most frequently in rocky places. Photosynthetic function is performed by the inflorescence as the leaf (leaves) is usually rudimentary and soon withering. Bulbs are reported to be edible and are used medicinally.

Scilla L. 1086000

Linnaeus: 308 (1753); Baker: 478 (1897) in part; Jessop: 233 (1970); Sölch *et al.*: 66 (1970) in part; Stedje: 10 (1996); Stedje: 11 (1998).

Schizocarphus Van der Merwe: t. 904 (1943).

Perennial, glabrous or pubescent, bulbous herbs, often forming clumps. **Bulb** globose, above or below ground; bulb scales imbricate or outer covering inner, usually with an oblong, hard, woody caudex and fibrous neck; roots many, often hard and thick. **Leaves** few to many; contemporary with flowers; usually erect; linear to ovate-acuminate; folded and clasping at base; margin smooth; soft, or sclerotic and closely costate; usually uniformly green. **Inflorescence** a terminal raceme of many, small flowers, rarely branched; peduncle erect; bracts small, filiform, decurrent, each often with a small lateral bracteole. **Flowers** usually blue, occasionally white tinged pinkish mauve or with a greenish mark at tepal apex; pedicels spreading, short or long, sometimes paired. **Tepals** free, spreading or strongly recurved, narrowly ovate, persistent. **Stamens** 6; filaments fused to base of tepals, fused at base, spreading, flattened; anthers versatile, introrse. **Ovary** globose to oblong; ovules several to many; style filiform; stigma apical. **Fruit** a membranous capsule, dehiscing loculicidally. **Seeds** rounded, obtusely angled, black, verrucose. $x = 4$, 7, 9 (5) (aneuploids, high polyploidy).

Species ± 40, Africa, Europe, Asia; ± 6 in sthn Afr., widespread, all countries and provinces. Found in grassland, stream banks, cliffs and rocky slopes. Cultivated ornamental, used medicinally.

Tenicroa Raf. 1080010

Rafinesque: 52, 60 (1837; as '1836'); Obermeyer: 577 (1981); Bond & Goldblatt: 56 (1984); Snijman: 284 (1985).

Sypharissa Salisb.: 38 (1866); Obermeyer: 111 (1980a). *Drimia* in sense of Jessop: 269 (1977) in part.

Perennial, deciduous, bulbous herbs. **Bulb** subglobose to globose, scales loose, pink or reddish. **Leaves** 1–many; usually present at flowering; terete, surrounded at base by membranous, striate sheaths with raised, transverse, purple or brown ridges. **Inflorescence** a raceme of few to many flowers; bracts membranous, at least lower ones conspicuously spurred. **Flowers** usually white with dark reddish brown or green keels, in one species purplish pink with a green and white eye at tepal base; sweetly scented. **Tepals** free, usually spreading. **Stamens** 6; filaments closely surrounding ovary; anthers basifixed, opening by longitudinal slits. **Ovary** oblong-globose; ovules several per locule; style terete, declinate, exserted; stigma globose, papillate. **Fruit** an ovoid or ellipsoid capsule; valves with thickened margins. **Seeds** oval, flat, black.

Species 5, sthn Afr., Namibia, Northern, Western and Eastern Cape. Closely related to *Drimia* and *Urginea*, but can be separated by the distinctive sheaths around the leaves; included in *Drimia* by Jessop (1977). Occurs in sandy habitats or humus-rich rock crevices.

Thuranthos C.H.Wright 1079010

Wright: 233 (1916a); Wright: t. 8680 (1916b); Dyer: t. 1439 (1964); Stirton: 161 (1976); Obermeyer: 139 (1980c); Roessler: 341 (1987); Kativu & Drummond: 112 (1994).

Drimia Jacq. in part, Baker: 442 (1897); Jessop: 269 (1977). *Urginea* Steinh. in part, Phillips: 306 (1917).

Perennial, deciduous, large, bulbous herbs. **Bulb** ovoid to globose, scales imbricate, loose, somewhat spatulate. **Leaves** 1–4; usually developing after flowering; linear; apex acuminate; clasping at base. **Inflorescence** a tall, lax raceme of 12–20 flowers; peduncle firm; bracts acuminate, at least lower ones usually spurred, each with a small linear bracteole beside or above it, falling early. **Flowers** green or brown with white transparent margins; nocturnal, open for one night only; scented; pedicels spreading, apex recurved. **Tepals** fused only at base, linear, reflexed at anthesis. **Stamens** 6, arising at base of tepals; filaments outcurved from base, then connivent, then erect and arcuate in upper half; anthers oblong, versatile, introrse, opening by longitudinal slits. **Ovary** ovoid; ovules many; style terete; stigma capitate. **Fruit** an erect, oblong, deeply 3-lobed capsule. **Seeds** flat, ovate, winged, black, shiny, papillate. $x = 10$ (1 report).

Species 4, sthn Afr. to Mozambique, Zimbabwe and Zambia; 3 in sthn Afr., rare but widespread, Namibia, Botswana, Northern Province, Gauteng, Mpumalanga, Free State, KwaZulu-Natal, Lesotho, Northern

and Eastern Cape. *Thuranthos* has been placed under *Drimia* by Jessop (1977), but because of the unique and specialised anther filaments is retained as a separate genus by other authors. The lower part of the anther filaments has been described as a lantern with longitudinal slits. Habitat is very variable and includes stony koppies, grassland and vleis.

Urginea Steinh. 1080000

Steinheil: 321 (1834); Baker: 462 (1897); Duthie: 1 (1928); Adamson: 237 (1942); Sölch *et al.*: 73 (1970); Deb & Dasgupta: 819 (1982).

Urgineopsis Compton: 107 (1930); Phillips: 189 (1951). *Drimia* in sense of Jessop: 269 (1977) in part; Stedje: 655 (1987); Stedje: 15 (1996).

Perennial, deciduous, small to large, bulbous herbs, sometimes forming clumps. **Bulb** ovoid to globose; scales imbricate, loose, outer enveloping inner, occasionally fibrous, occasionally pinkish; roots many, usually thick. **Leaves** 1–many; usually developing after flowering; terete, linear to lorate. **Inflorescence** a tall or short, cylindrical or subcapitate raceme with few to many flowers; peduncle erect, cylindrical; bracts usually spurred, the tail occasionally large and coloured, falling early. **Flowers** white, mauve, brown or green, with darker keels; pedicels short to long, erect or spreading-erect. **Tepals** free or rarely fused at base, lobes usually spreading or spreading-erect, deciduous, cohering above when withered, circumscissile below. **Stamens** 6, free, arising from base of tepals; filaments spreading, or erect and somewhat connivent, filiform or somewhat flattened; anthers linear or linear-oblong, versatile, introrse, opening by longitudinal slits. **Ovary** sessile; ovules few–many; style terete; stigma capitate. **Fruit** a globose to ovoid capsule, 3-angled, dehiscing loculicidally. **Seeds** flat, winged, black, shiny, papillate. $x = 10$ (aneuploids, high polyploidy).

Species ± 100, Africa, Mediterranean, India; ± 24 species in sthn Afr., widespread, all countries and provinces. Some species are better placed in *Drimia*, with some authors regarding *Urginea* as a synonym of *Drimia* (Jessop 1976, Stedje 1996). Known to cause poisoning of stock. Used medicinally.

Veltheimia Gled. 1097000

Gleditsch: 66 (1771); Baker: 470 (1897); Obermeyer: t. 1356 (1961); Bond & Goldblatt: 57 (1984).

Perennial, deciduous or ± evergreen, bulbous herbs. **Bulb** ovoid or ellipsoid; scales long, fleshy or membranous. **Leaves** many; erect, broadly linear, acuminate; margin entire, wavy; glaucous or deep green. **Inflorescence** a terminal cylindrical to subcapitate dense raceme, overtopping leaves; peduncle often mottled; bracts linear to acuminate, each with a smaller lateral bracteole, falling early. **Flowers** pink or red; pendulous; pedicels short, curved downwards. **Tepals** fused below forming a slightly curved, cylindric tube; lobes short, rounded, slightly spreading. **Stamens** 6, arising from ± middle of perianth tube, shortly exserted from mouth of tube; filaments filiform, decurrent; anthers dorsi- or basifixed, introrse. **Ovary** ovoid; ovules 2 per locule; style filiform, ultimately exserted; stigma small, apical. **Fruit** a membranous, inflated, 3-sulcate capsule. **Seeds** pear-shaped, black, verrucose. $x = 10$ (1 report, polyploidy).

Species 2, sthn Afr., Northern, Western and Eastern Cape. Unusual in the family for its large, membranous, inflated capsules. Has been cultivated for over two centuries; a yellow sport is also available in the horticultural trade.

Whiteheadia Harv. 1100000

Harvey: 396 (1868); Baker: 418 (1897); Obermeyer: t. 1450 (1965a); Sölch *et al.*: 74 (1970); Jessop: 433 (1976); Müller-Doblies & Müller-Doblies: 79 (1997).

Perennial, deciduous bulbous herbs. **Bulb** subglobose to globose, covered with thin tunics. **Leaves** 2; contemporary with flowers; flat on ground or spreading; rounded-oblong; apex obtuse; veins conspicuously sunken; succulent, delicate; pale green. **Inflorescence** a spike of up to 50 flowers (occasionally more); peduncle short but lengthening in fruit, tapered; bracts larger than flowers, upper bracts sterile, persistent, widely ovate-acuminate, spreading, green, bases decurrent. **Flowers** green with white margins or whitish; campanulate. **Tepals** fused at base forming a short wide tube; lobes spreading-arcuate, triangular to oblong, persistent. **Stamens** 6, arising from perianth tube; filaments connate at base, forming a short, erect cup; anthers introrse, basifixed. **Ovary** ovoid; ovules many in each locule; style short, curved, tapering; stigma apical. **Fruit** an obtriangular capsule, strongly 3-winged; dehiscing loculicidally. **Seeds** black, shiny.

Species 2, sthn Afr., Namibia, Northern and Western Cape. *Whiteheadia bifolia* (Jacq.) Baker was the sole member of the genus until the discovery and subsequent publication of *W. etesionamibensis* D.Müll.-Doblies & U.Müll.-Doblies in 1997. Occurs in stony, rocky places.

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Hydrocharitaceae

(Alismatidae—Alismatales)

Compiled by R.P. Glen

Freshwater or marine, perennial or annual herbs, usually monoecious or dioecious, partially or completely submerged. **Roots** terrestrial or floating. **Leaves** alternate, opposite or in verticils, radical, in rosettes or cauline, submerged or with floating blades, with or without sheathing base, margins sometimes finely dentate. **Flowers** unisexual or rarely bisexual, regular to slightly irregular (*Vallisneria*), submerged in marine genera, in others exserted during anthesis, usually exserted from a pedunculate, or rarely sessile, tubular, bifid spathe, or rarely subtended by 2 free, opposite bracts; pollination in marine genera hydrophilous, in others entomophilous. **Male flowers** usually many and, in some genera, becoming detached and free-floating; perianth 1- or 2-seriate, with 3 outer segments often sepaloid, valvate, and 3 inner petaloid, imbricate; stamens (1)3–many in one or more trimerous whorls, inner occasionally staminodial; anthers 2-thecous, opening longitudinally, pollen sphaeroid or, in marine genera, confervoid (united in strings); rudimentary ovary sometimes present. **Female flowers** mostly solitary inside the spathe, with an inferior, 1-locular ovary, with 3 or 6, rarely more, parietal placentas at times protruding towards centre; ovules few to many, anatropous or orthotropous, bitegmic; styles as many as placentas; stigmas simple or bifid. **Fruit** rounded or tubular, fleshy or leathery, rarely dry and dehiscent, usually rostrate, with persistent style bases. **Seeds** few to many, dispersed by dissolution of walls, which become mucilaginous; embryo straight; endosperm 0 or scanty (in *Ottelia*).

Genera 17, species 100, cosmopolitan, all aquatic, 3 marine; sthn Afr.: genera 5 (1 introduced freshwater; 1 marine, 3 freshwater), species 13.

Wright: 1 (1912); Obermeyer: 100 (1966); Cook: 96 (1990).

Key to genera

1a Marine plants; leaves in pairs from creeping rhizome; flowers submerged; perianth segments 3 or ± reduced (HALOPHILOIDEAE) ..... **Halophila**
1b Freshwater plants; leaves rosulate or cauline; flowers exserted above water during anthesis; perianth segments 3 + 3 (HYDROCHARITOIDEAE):
2a Plants forming long, leafy, submerged stems from a perennial rhizome; spathes sessile, axillary:
3a Leaves arranged in whorls of 3 or more, apex not recurved, acute, bearing one terminal spine, margin without fibre cells, margin serrulate ..... ***Egeria**
3b Leaves spirally arranged, apex often recurved, bearing two spines, margin serrate or toothed ..... **Lagarosiphon**
2b Plants rosulate, ± stemless, annual or perennial with runners; spathes pedunculate:
4a Male flowers becoming detached at anthesis, free-floating; stamens 1–3 ..... **Vallisneria**
4b Male flowers remaining attached to plant; stamens 6–15 ..... **Ottelia**

*Egeria Planch. 0087010

Planchon: 79 (1849); Obermeyer: 100 (1966); Aston: 215 (1973); Cook & Urmi-König: 73 (1984); Cook: 97 (1990).

Permanently submerged, attached, much-branched, densely leafy, dioecious perennials. **Leaves** in whorls of 3 or more, sessile, linear to widely lanceolate, 1-nerved, margins without fibre cells, serrulate, apex acute, terminating in a single spine. **Inflorescence** in axil of foliage leaves; spathe sessile or subsessile, of 2 united bracts. **Flowers** unisexual, arising from spathes situated in upper leaf axils; each flower with a thread-like hypanthium; sepals 3; petals 3, large, 2–3 times longer than sepals and alternating with them. **Male flowers** 2 or 4, held above water surface on rigid pedicels; sepals ovate, spreading, green; petals obovate to suborbicular, white; stamens 9 or rarely more; filaments club-shaped, orange, glandular, much longer than anthers, central 3 erect and opposite sepals, outer 6 in 2 whorls of 3 and upcurved; anthers unequal, each theca dehiscing longitudinally into two equal valves; staminodes 0; pollen liberated in monads; pistillodium 3-lobed, green. **Female flowers** solitary, similar to male flowers; stamens replaced by 3 linear, yellow to orange staminodes, elongated hypanthium bearing flower above water surface; ovary of 3 carpels; enclosed in base of hypanthium, placentas parietal; ovules several; styles 3, flattened, variously bifid or trifid. **Fruit** ellipsoidal, irregularly dehiscent. **Seeds** long, spindle-shaped. $x = 12, 23$ (1 report each, polyploidy).

Species 2, both from subtropical and temperate South America; **Egeria densa* Planch. has been introduced into KwaZulu-Natal, probably during Medley Wood's time when a submerged aquatic was needed as an 'oxygen plant' for the fish introduced to combat malaria-carrying mosquito larvae; also recorded from the Baakens River in Port Elizabeth (Eastern Cape), a sewerage pond in Bloemfontein (Free State) and a dam in Stellenbosch (Western Cape). This potentially

serious weed, is a popular aquarium or outdoor pond plant and is sold at various nurseries and aquarium shops. It is often confused with some of the species of *Lagarosiphon*, but it is more robust and the leaves are in definite whorls.

Halophila Thouars 0085000

Thouars: 2 (1808); Obermeyer: 100 (1966); Den Hartog: 238 (1970); Cook: 99 (1990).

Marine perennials, monoecious or dioecious, with a much-branched creeping rhizome; rhizomes bearing at nodes an abbreviated shoot and a pair of leaves, each surrounded by a basal scale; roots simple, 1 or rarely 2 from a node, densely covered with long root hairs. **Leaves** in pairs, petiolate, linear, lanceolate, oblong or ovate, entire or serrulate, glabrous or pubescent; midrib distinct, with a prominent lateral marginal nerve connected to midrib by many oblique secondary nerves. **Flowers** unisexual, usually solitary in axil of a secondary shoot, rarely 1 or 2 male and a female flower together in a spathe; spathe of 2 free, membranous bracts. **Male flowers** shortly pedicelled, with 3 perianth segments; stamens 3, anthers sessile, 2–4-celled, extrorse; pollen adhering to form threads; pollination hydrophilous. **Female flower** sessile; ovary ovoid, beaked, bearing 3 reduced perianth segments near apex; styles 2–6, linear. **Fruit** ovoid, rostrate, thin-walled. **Seeds** few to many, small, globose. $x = 9$.

Species 9, tropical to warm seas of the world; 1 in sthn Afr.: *Halophila ovalis* (R.Br.) Hook.f., coastal waters of KwaZulu-Natal as far south as Knysna (Western Cape).

Lagarosiphon Harv. 0088000

Harvey: 230 (1841); Wright:1(1912); Obermeyer:102 (1966); Symoens & Triest: 441 (1983); Cook: 102 (1990).

Submerged (except for flowers during anthesis), dioecious, rooted herbs from a perennial rhizome; stems long, terete, leafy; branches arising from inside a spathe next to a flower; leafy apices compact; internodes elongating later. **Leaves** alternate, subopposite or whorled, widely spaced below, dense above, linear to linear-lanceolate; margin dentate with unicellular teeth; tissues of lamina differing in each species, with 2 minute axillary scales (intra-vaginal squamulae). **Male inflorescence** axillary; spathe valves fused, obovate, ovate or lanceolate, compressed or cup-shaped, dentate; axis (rudimentary scape) producing many pedicellate flowers (up to 50 or more) consecutively; buds become detached and rise to surface (because of an enclosed air bubble) where they expand and recurve suddenly to form a bell-shaped, floating flower; perianth 3 + 3, outer segments slightly narrower; stamens 3; filaments ultimately parallel to water surface with anthers at right angles to them; each anther gives rise to 16 pollen grains (4 per pollen sac); pollen grains large; staminodes 3, longer than stamens, papillate, usually coloured above, joined at top (acting as a sail). **Female inflorescence** axillary; spathe valves fused, narrowly oblong, ovoid or cylindrical, entire or toothed, containing 1–3 flowers; perianth tube exserted laterally near apex of spathe, lengthening (giving off gas bubbles buoying it up) until flower reaches surface of water (ultimate length of flower varies with species); limb 6-lobed; staminodes 3, minute, filiform; ovary with 3 parietal placentas; styles 3, adnate to perianth tube, each divided into 2 long, papillate, often brightly coloured, stigmatic arms; ovules 6–30, orthotropous, funicle short or long, straight or bent. **Fruit** a capsule protruding from torn spathe (the larger inner spathe valve bursting along midrib), rostrate (persistent perianth base forming a beak) ultimately becoming mucilaginous and disintegrating. **Seeds** few to many, cylindrical, shortly stipitate, apex acute, closely ribbed or honeycombed, buoyant at first, sinking later. $x = 11$ (7, 10—1 report each) (polyploidy).

Species 9, tropical Africa and Madagascar, 8 occur in Africa south of the Sahara, 1 is endemic to Madagascar; 5 in sthn Afr., *Lagarosiphon major* (Ridl.) V.A.Wager has naturalised in Europe and New Zealand.

Ottelia Pers. 0095000

Persoon: 400 (1805); Obermeyer: 108 (1966); Cook *et al.*: 263 (1984); Cook: 102 (1990).

Aquatic, rooted, ± stemless, armed or unarmed annuals, dioecious or monoecious or sometimes flowers bisexual; roots many, simple. **Leaves** rosulate, sessile or petiolate, sheathing at base, submerged or in some species also with floating blades; lamina of submerged leaves ribbon-like, linear to lanceolate, with floating blade ovate to cordate; nerves 3–11, distinct, connected by cross-veins. **Inflorescence** pedunculate; spathes saccate, containing many male flowers; female and bisexual flowers usually solitary; spathes firm, with prominent, sometimes muricate, ribs or wings, or occasionally smooth. **Flowers**: perianth white or yellow, tubular, with 3 outer segments sepaloid, persistent, and 3 inner larger, petaloid, slightly exserted above surface of water at anthesis, ephemeral; pollination entomophilous (or flowers often cleistogamous). **Male flowers** usually 1–3 exserted at a time, with pedicels lengthening rapidly at anthesis; stamens 6–15; anthers basifixed; pollen globular, tuberculate; gynoecium rudimentary. **Female flowers**: ovary flask-shaped with 3–6 parietal placentas intruding towards centre; styles 3–15, each divided into 2 stigmatic arms; ovules many, amphitropous; staminodes present or 0. **Fruit** ripening inside accrescent spathe; lower part of perianth tube forming its beak. **Seeds** many, small, fusiform, tomentose or glabrous, many released in pulpy mass. $x = 11$ (10, 12, 17, 26) (aneuploids, high polyploidy).

Species 21, tropics and subtropics, 13 in Africa, 7 in Asia and Australia and 1 in South America; 4 in sthn Afr., restricted to the warmer parts, **Ottelia alismoides* (L.) Pers. has spread out of Asia and has naturalised in Africa, Europe and North America. Seeds embedded in pulp (rather like bananas), dispersed by water, fish and perhaps other animals.

Vallisneria L. 0089000

Linnaeus: 1015 (1753); Wright: 5 (1898); Podlech: 4 (1966); Lowden: 269 (1982); Cook: 105 (1990).

Submerged, freshwater, herbaceous, grass-like, glabrous, perennial, ± stemless aquatics, forming runners, dioecious. **Leaves** rosulate, radical, linear, up to 2 m or more long, sheathing at the base, with 3–9 parallel veins and faint transverse veinlets, margin denticulate, apex obtuse. **Inflorescence** axillary; spathe of 2 united bracts. **Male flowers** very small, many, shortly pedicelled, maturing consecutively, becoming detached as buds, floating and expanding after reaching surface of water; sepals 3, ovate, convex; petals 3, minute; stamens 1–3, divergent. **Female flowers** axillary; solitary, tubular, bilobed; peduncle long, reaching surface (if not too deep), spirally contracted after anthesis; sepals 3, ovate or oblong-ovate; petals 3, minute; ovary 1-locular, with 3 parietal placentas bearing many ovules; styles 3, bilobed. **Fruit** fusiform, breaking irregularly. **Seeds** many, ellipsoidal, up to 2 mm long. $x = 10$, 12 (7, 8, 9—1 report each) (polyploidy).

Species 4, tropics and subtropics; 1 in sthn Afr.: *Vallisneria aethiopica* Fenzl, N Namibia and Botswana; recently recorded from Lydenburg (Mpumalanga) and Cape Town (Western Cape), probably escapes from aquaria. Plant is totally submerged; male flowers abscise and float on the water surface 'caught' by floating female flowers.

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Hypoxidaceae

(Liliidae—Asparagales)

Compiled by D.A. Snijman

Herbaceous geophytes, with vertical rhizomes or fibrous corms, often pubescent with uniseriate or pluriseriate hairs; roots with scalariform perforation plates. **Leaves** basal, 1–many, tristichous, striate, deciduous or persistent, dorsiventral, linear to lanceolate, sometimes pseudopetiolate or plicate, often containing raphides; bases fibrous, enclosed in tubular membranous sheaths; stomata paracytic. **Inflorescence** spicate, racemose or corymbose, sometimes reduced to a single flower; scape leafless, often hairy; bracts present or 0. **Flowers** bisexual, regular, trimerous or rarely tetramerous; pedicels long or short. **Tepals** 6(4), free or fused into a sometimes long, narrow tube, persistent or deciduous, yellow, orange, red, pink or white; lower surface often green or lined with red, glabrous or pubescent. **Stamens** 6(2, 3 or 4); filaments short, free, arising from tepal base; anthers basifixed or dorsifixed, bilocular, introrse or latrorse, opening by longitudinal slits, entire or 2-lobed at base, rarely with apical appendages; pollen sulcate with finely reticulate exine. **Ovary** inferior, 3-locular with axile placentation, or 1-locular with 3 parietal placentas; ovules few to many; nectaries 0; style 1(0), short; stigmas (2)3 or 6. **Fruit** dehiscent and either a circumscissile, septicidal or loculicidal capsule, or indehiscent, subsucculent and sometimes beaked. **Seeds** subglobose, rarely J-shaped, with a thick, dark brown or black, brittle, smooth to verrucose phytomelan crust; raphe prominent; hilum distinct.

Genera 9, species ± 130, widespread in South America, Australia and tropical Asia but most diverse in sthn Afr., where 5 of the 6 genera are endemic; sthn Afr.: genera 6, species ± 88.

Baker: 93 (1878); Baker: 171 (1896); Nel: 234 (1914a); Nel: 287 (1914b); Markötter: 43 (1936); De Vos: 159 (1948); Hutchinson: 166 (1934); Hutchinson: 678 (1959); Sölch & Roessler: 1 (1969); Geerinck: 66 (1969); Thompson: 111 (1976); Thompson: 429 (1978); Hilliard & Burtt: 72 (1978); Dahlgren *et al.*: 161 (1985).

As shown in Baker's (1896) classification of Amaryllidaceae, the epigynous flowers, paracytic stomata, and fibrous leaf bases of Hypoxidaceae were previously taken to reflect an affinity with Velloziaceae. Important differences in leaf anatomy and seed morphology, however, led to the separation of Hypoxidaceae and Velloziaceae into different orders (Dahlgren *et al.*, 1985). The generic concepts within Hypoxidaceae have continued to vary since Nel's (1914a, 1914b) major work on the family. The establishment of stable generic concepts still awaits a thorough character survey of the entire family.

Many *Hypoxis* species are an important source of medicine in sthn Afr.

Key to genera

1a Plants glabrous or, if sparsely pubescent, then hairs uniseriate and absent from tepals:
- 2a Stamens 3 ..... **Pauridia**
- 2b Stamens 6(2 or 4):
  - 3a Flowers with tepals free to the base, only occasionally the tepals arising from a short solid neck; ovary held free of leaf sheaths when flowering; fruit dehiscent, thin-walled, beakless ..... **Spiloxene**
  - 3b Flowers with an elongated solid neck between ovary and tepals; ovary usually hidden in leaf sheaths while flowering; fruit indehiscent, ± beaked:
    - 4a Leaves often pleated; flowers yellow; ovary unilocular; fruit subsucculent to thin-walled ..... **Empodium**
    - 4b Leaves channelled; flowers white, ovary trilocular; fruit thin-walled ..... **Saniella**

1b Plants, including the tepals, densely pubescent; hairs predominently pluriseriate, varying from biramous to stellate:
- 5a Flowers yellow, occasionally white; perigone segments free to base, patent; ovary beakless ..... **Hypoxis**
- 5b Flowers red to white; perigone segments inflexed, closing the perigone throat; ovary sometimes beaked ..... **Rhodohypoxis**

Empodium Salisb. 1229010

Salisbury: 43 (1866); Garside: 214 (1950); Bullock: 389 (1962); Hilliard & Burtt: 308 (1973).

Fabricia Thunb.: 29 (1779). *Forbesia* Eckl. ex Nel: 287 (1914b); Phillips: 205 (1951). *Curculigo* Gaertn. sect. *Empodium* Benth.: 718 (1883); Baker: 173 (1896); Zimudzi: 311 (1994).

Small solitary or caespitose geophytes, glabrous or sparsely pubescent with uniseriate hairs. **Corm** annual, subglobose, covered with reticulate fibrous tunics; roots thin, arising from lower half of corm. **Leaves** 1–several, developing after or occasionally during flowering, linear to ovate, often plicate, glabrous or sparsely hairy on ribs or margins; bases surrounded by tubular, sometimes dark, membranous sheaths, often gaping and acute apically. **Inflorescence** 1-flowered, 2–6 per corm; scape reduced; bracts 0. **Flowers** stellate to hypocrateriform, mostly yellow; pedicels hidden within leaf sheaths or shortly exserted, sometimes sparsely ciliate, triangular in

cross section. **Tepals** 6, arising from a short or long solid, sometimes ciliate neck, narrowly ovate, patent or reflexed, green-backed, glabrous. **Stamens** 6, erect; filaments held close together, short, arising from tepal base; anthers linear, basifixed, sometimes with filiform apical appendages. **Ovary** shortly exserted to enclosed by leaf sheaths, 1-locular with 3 parietal placentas; ovules on long, often swollen funicles; style short or long with 3 long, subulate stigmatic lobes. **Fruit** indehiscent, fusiform, prolonged into a short or long terete beak, subsucculent to thin-walled when ripe, disintegrating irregularly from apex. **Seeds** globose, black, shiny, warty. $x = 7$.

Species ± 9, endemic to sthn Afr., widespread, found in all countries and provinces except Namibia and Botswana.

Hypoxis L. 1230000

Linnaeus: 986, 1366 (1759) in part, excluding *H. fascicularis* L.; Baker: 174 (1896) in part, excluding subgenus *Ianthe*; Wilsenach: 75 (1967); Wilsenach & Papenfuss: 111 (1967); Wilsenach & Warren: 133 (1967); Sölch & Roessler: 1 (1969); Heideman: 889 (1983); Nordal *et al.*: 15 (1985).

Herbaceous pubescent geophytes; indumentum on leaves, pedicels, ovary and backs of outer tepals; hairs whitish to reddish brown, stellate to biramous, rarely wanting. **Rhizome** vertical, slow-growing, often large, subglobse to elongated, often with yellow sap; roots stout, present mostly in upper half of rhizome. **Leaves** few to many, basal, tristichous, striate, linear to ovate, with intercalary meristem, clasping basally and often surrounded by dry basal fibres of older leaves, occasionally petiolate. **Inflorescence** an axillary raceme or corymb, rarely 1-flowered; scape long, leafless; bracts narrow, 1 or sometimes 2 subtending each flower. **Flowers** stellate, often opposite, yellow or occasionally white, with green backs; pedicels long or short. **Tepals** 6(4), free, patent, subequal, narrowly ovate, persistent and connivent during ripening of fruit. **Stamens** 6(4), exserted, arising from tepal base, spreading, short; filaments filiform to subulate; anthers latrorse, basifixed, ± versatile when older. **Ovary** turbinate to clavate, 3-locular, with many axile ovules; style short, cylindrical; stigma obconical, 3-grooved. **Capsule** turbinate to obovoid, thin-walled, circumscissile or loculicidal. **Seeds** subglobose, black to dark brown, shiny or dull, verrucose to echinulate; raphe and hilum distinct. $x = 7$ (aneuploids, high polyploidy).

Species ± 90, but probably fewer warrant recognition; pantropical, widespread in sub-Saharan Africa, America, SE Asia and Australia; sthn Afr. is a centre of diversity, ± 45 in sthn Afr., found in all countries and provinces except Botswana and Northern Cape.

Pauridia Harv. 1230030

Harvey: 341 (1838); Baker: 172 (1896); Garside: 214 (1950); Geerinck: 81 (1969); Thompson: 621 (1979).

Small glabrous, deciduous geophytes. **Corm** annual, flat-based, with reticulate fibrous tunics; roots arising from base of new corm, mostly thin, a few thick and contractile. **Leaves** 4–8, rosulate, semiterete to broadly linear, membranous and sheathed below, outermost without a lamina. **Inflorescence** 1- or 2-flowered; usually solitary in each leaf axil; scape simple, with 2 opposing filiform bracts below each flower. **Flowers** regular, white to pale pink; pedicels long or very short. **Tepals** connate into a short or long perigone tube; segments spreading, narrowly ovate, shorter or longer than tube. **Stamens** 3, arising from perigone throat opposite inner lobes; filaments short; anthers basifixed, latrorse with opposing locules, lobed below and above. **Ovary** 3-locular, ovoid, with many axile ovules; style bearing 3 recurved hooks; stigma 3-lobed, lobes long, linear, erect, often cohering. **Fruit** indehiscent, ovoid to obconic, crowned with old perigone tube, thin-walled, disintegrating irregularly. **Seeds** globose, black, shiny, verrucose.

Species 2, endemic to the winter-rainfall region of sthn Afr., Western Cape.

Rhodohypoxis Nel 1230020

Nel: 239, 257 (1914a); Nel: 300 (1914b); Baker: 179 (1896) in part, under *Hypoxis*; Hilliard & Burtt: 43 (1978).

Small pubescent, rarely glabrous geophytes; indumentum on leaves, pedicels, ovary and backs of outer tepals; hairs tufted with 2 or more unequal branches. **Rhizome** small, vertical, oblong, mucilaginous, with fibrous tunics; roots thin or fleshy and contractile. **Leaves** 5–10, basal, rosulate, linear to elliptic, enclosed by colourless, membranous, tubular sheaths. **Inflorescence** 1- or 2-flowered; scape solitary in leaf axil, simple or binate, short and included in leaf bases or overtopping leaves; bracts linear or vestigial. **Flowers** red, pink or white with a closed throat; pedicels short, erect or deflexed in fruit. **Tepals** connate into a short perigone tube; segments spreading, longer than tube; inner segments clawed and inflexed basally, covering flower centre before spreading outwards. **Stamens** 6, included, arising from perigone tube in 2 series, outer above and slightly larger than inner; filaments very short, attached to anther low down on back; anthers apiculate, introrse. **Ovary** obpyramidal, trilocular, with or without a beak; ovules ± 4 in each locule, axile; style short or 0; stigma trilobed. **Capsule** thin, papery, circumscissile, septicidal or breaking up irregularly below apex. **Seeds** subglobose, black, shiny, mamillate or echinulate, raphe conspicuous. $x = 6$ (polyploidy).

Species 6, endemic to sthn Afr., at high altitudes in the eastern regions, particularly in the Drakensberg: Northern Province, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho and Eastern Cape.

Saniella Hilliard & B.L.Burtt 1230040

Hilliard & Burtt: 70 (1978); Hilliard & Burtt: 130 (1987).

Dwarf geophytic, glabrous herbs. **Rhizome** small, oblong, fleshy; roots fleshy and contractile. **Leaves** 3–6, radical, deeply channelled above, membranous and sheathing at base. **Inflorescence** 1-flowered; scape reduced; bracts unknown. **Flower** stellate, white with pale yellow base; pedicels very short. **Tepals** arising from a long neck; segments spreading, elliptic, connate into a short perigone tube basally. **Stamens** 6, arising near base of perigone tube, outer with slightly longer filaments and slightly shorter anthers than inner stamens; filaments attached dorsally near anther base; anthers latrorse. **Ovary** trilocular; style short; stigma (2)3-fid, papillose on inner surface. **Fruit** subterranean, thin-walled, breaking open irregularly. **Seeds** ellipsoid, black, mammillate; raphe and micropyle conspicuous.

Species 1: *Saniella verna* Hilliard & B.L.Burtt, endemic to the southern Drakensberg, at high altitudes, in KwaZulu-Natal, Lesotho and Eastern Cape.

Spiloxene Salisb. 1230010

Salisbury: 44 (1866); Garside: 267 (1936); Garside: 214 (1950).

Ianthe Salisb.: 44 (1866); Baker: 174 (1896) under *Hypoxis* L. subgenus *Ianthe*.

Small, mostly glabrous geophytes. **Corm** annual, covered with reticulate to pectinate fibrous tunics, or twisted hard roots, rarely smooth; old corms discoid, persisting near or at base of new corm; roots many, thin or sometimes contractile, arising from base of new corm. **Leaves** 1–12, tristichous, developing before flowering,

ovate to linear, V-shaped, channelled or terete in cross section, glabrous or occasionally ciliate with uniseriate hairs, surrounded basally by membranous tubular sheaths. **Inflorescence** cymose, 1–6-flowered, glabrous; scape exserted from leaf sheaths; bracts 1 or 2, subtending each flower, foliaceous to linear or vestigial. **Flowers** stellate, orange, yellow or white, tinged with red or green on lower surface, occasionally with a dark centre; pedicels usually long, erect or deflexed in fruit. **Tepals** 6(4), free to base or rarely arising from a short solid neck, narrowly ovate, patent, persistent and connivent during ripening of fruit. **Stamens** 6(2 or 4), 2-seriate, exserted; filaments short; anthers linear, basifixed, latrorse. **Ovary** cylindrical to trigonous, 3-locular or rarely unilocular; ovules many, axile; style short, columnar; stigmas 3, free or connate, papillate on inner surface and margins. **Capsule** clavate to turbinate, circumscissile or less commonly septicidal. **Seeds** subglobose or J-shaped, black and shiny, minutely tuberculate; raphe and hilum conspicuous.

Species ± 25, endemic to the winter-rainfall region of sthn Afr., usually in seasonally wet flats or rock crevices, Namibia, Northern, Western and Eastern Cape.

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Iridaceae

(Liliidae—Asparagales)

Compiled by P. Goldblatt & J.C. Manning

Perennial evergreen or deciduous herbs, rarely shrubs with anomalous secondary growth. **Rootstock** a rhizome, corm, or when shrubs, a woody caudex. **Leaves** basal and cauline, sometimes lower 2 or 3 without blades, sheathing stem base and reaching shortly above ground (thus cataphylls); mostly distichous, bases usually imbricate, sheaths of foliage leaves open or closed, usually contemporary with flowers, occasionally produced later, rarely already dry at flowering, occasionally leaves of flowering stem with reduced to entirely sheathing blades, then foliage leaves sometimes produced from separate shoots; blades either unifacial and oriented edgewise to stem, parallel-veined, without or with a distinct central vein, this sometimes thickened, surface plane, ribbed, plicate or occasionally terete; or bifacial and oriented with adaxial surface facing stem, then channelled to flat and usually without a median vein; margins plane or sometimes undulate to crisped, sometimes thickened and fibrotic or raised into wings held at right angles to surface. **Flowering stems** aerial or subterranean, simple or branched, terete or compressed, then often angled or winged. **Inflorescence** either composed of umbellate monochasial cymes (i.e. rhipidia) enclosed in opposed leafy to dry bracts (spathes) with flowers usually pedicellate, sometimes sessile, each flower within rhipidium subtended by one bract; or flowers sessile, subtended by a pair of opposed bracts and solitary or in a spike. **Flowers** bisexual, with a petaloid perianth of 2 whorls of 3 tepals each, rarely inner whorl suppressed, actinomorphic or zygomorphic and then usually bilabiate, variously coloured, often with contrasting markings; scented or unscented. **Tepals** usually large and showy, whorls equal or unequal, when zygomorphic, posterior tepal usually largest and inclined to hooded, lower three often smallest and with contrasting markings (nectar guides); free to base or united in a tube, tube straight or curved, cylindric or funnel- to trumpet-shaped. **Stamens** 3, arising at base of outer tepals, or in tube, symmetrically disposed or

unilateral and arcuate, or sometimes declinate; filaments filiform, free or partly to completely united; anthers 2-thecous, usually extrorse and dehiscing longitudinally, occasionally apically or basally dehiscent; pollen monosulcate, trisulcate, zonasulculate, dizonasulculate, spiraperturate or inaperturate, operculate or not, exine reticulate to areolate or micropunctate. **Ovary** inferior, 3-locular with axile placentation (rarely 1-locular with parietal placentation); ovules anatropous or campylotropous, many to few, in 2 rows per locule, rarely in 1; style filiform, usually 3-branched, sometimes simple, or 3-lobed, style branches either filiform to distally expanded, sometimes each divided in upper half and stigmatic towards apices, or branches thickened or flattened and petaloid, stigmas then abaxial below apices. **Fruit** a loculicidal capsule, rarely indehiscent, firm to cartilaginous, occasionally woody, xerochastic or rarely hygrochastic. **Seeds** globose to angular or discoid, sometimes broadly winged, usually dry, rarely seed coat fleshy or an aril present, rugulose or smooth, shiny or matte; endosperm hard, with reserves of hemicellulose, oil and protein; embryo small.

A family of ± 70 genera and 1 800 species, nearly worldwide, but rare in tropical lowlands; best represented in sthn Afr.: 32 genera, 1 020 species.

Goldblatt: 607 (1990a); Goldblatt: 1 (1991); Chase *et al.*: 109 (1995).

Iridaceae are of considerable economic importance in horticulture and cut-flower industry, especially *Iris*, *Gladiolus* and *Freesia*. Several other genera (*Dietes*, *Crocus*, *Watsonia*) are cultivated in gardens in both tropical and temperate areas. Many species of *Moraea* are poisonous and cause significant losses in cattle- and sheep-raising areas. Some genera are of importance in traditional medicine, especially *Gladiolus*. Corms of several species of *Lapeirousia* and a few of *Moraea* are eaten locally. The corms of these and genera such as *Freesia*, *Gladiolus*, and *Watsonia* were an important source of food for humans in prehistoric time and are a valued dietary supplement in some rural communities today.

The family is currently divided into four subfamilies (Goldblatt 1990a), but tribal delimitations remain unsatisfactory. Subfamily Isophysidoideae is monotypic comprising the Tasmanian *Isophysis* T.Moore with a superior ovary. The remaining subfamilies, Nivenioideae, Iridoideae and Ixioideae are all represented in sthn Afr.

Classification of Iridaceae

I. Subfamily NIVENIOIDEAE

(Mostly evergreen perennials, or woody shrubs; rootstock a woody caudex or a rhizome; inflorescences paired (binate) rhipidia or sometimes rhipidia single; flowers actinomorphic, with or without a perianth tube, fugaceous or long-lived, mostly blue.): *Aristea, Klattia, Nivenia, Witsenia*

II. Subfamily IRIDOIDEAE

(Evergreen or deciduous perennials; rootstock a rhizome or sometimes a corm with roots produced from apical bud (or bulbs or obsolete); leaves often bifacial and channelled or sometimes terete; inflorescences rhipidia; flowers actinomorphic, rarely with a perianth tube, often fugaceous, variously coloured.): *Bobartia, Dietes, Ferraria, Moraea*

III. Subfamily IXIOIDEAE

(Evergreen or more often deciduous perennials; rootstock a corm producing roots from base; inflorescences spikes or flowers solitary on aerial or subterranean branches; flowers always sessile and subtended by 2 bracts, actinomorphic or zygomorphic, then usually bilabiate, with a perianth tube, long-lived, variously coloured.): *Babiana, Chasmanthe, Crocosmia, Devia, Dierama, Duthiastrum, Freesia, Geissorhiza, Gladiolus, Hesperantha, Ixia, Lapeirousia, Melasphaerula, Micranthus, Pillansia, Radinosiphon, Romulea, Sparaxis, Syringodea, Thereianthus, Tritonia, Tritoniopsis, Watsonia, Xenoscapa*

Key to genera

1a Flowers in umbellate clusters (rhipidia) enclosed by a pair of opposed leafy bracts (spathes), rarely solitary on peduncles, or plants acaulescent but then style either dividing below anthers into tangentially compressed, petal-like branches or dividing below or above base of anthers and obscurely 3-lobed apically, lobes entire or fringed; individual flowers sessile or pedicellate; flowers with tepals free to basally connate, or united in an extended tube; rootstock a woody caudex, a rhizome, or a corm:

2a Plants evergreen shrubs with woody aerial stems; rootstock a woody caudex; individual flowers sessile and tepals always united in a well-developed tube and lasting at least 2 days:

3a Inflorescence compound, forming a compressed capitulum enclosed by enlarged green or coloured leaves; tepals linear-spathulate, longer than the perianth tube ..... **Klattia**

3b Inflorescence either compound, forming branched panicles or corymbs, or flowers borne in isolated pairs, enclosed in green or brown spathes; tepals oblong to ovate, longer or shorter than the perianth tube:

4a Flowers shades of blue; tepals patent, not villous on outside; stamens and/or style well exserted from flower, sometimes species heterostylous ..... **Nivenia**

4b Flowers green to blackish with tepals yellow on reverse; tepals remaining closed during flowering, densely villous on outside; stamens included in flower ..... **Witsenia**

2b Plants perennial, either with herbaceous aerial stems or acaulescent, sometimes evergreen; rootstock a rhizome or corm; individual flowers stalked or sessile, tepals free, basally connate, or united in a tube, lasting 1 day, or 2 or more days:

5a Style eccentric, apically notched or lobed, lobes sometimes fringed; flowers usually deep blue (occasionally lilac, white or pale blue); tepals shortly connate basally ..... **Aristea**

5b Style central, usually dividing near base of anthers into distinct branches, these either extending between anthers or appressed against them, sometimes style exceeding anthers; flowers variously coloured; tepals free, connate basally or united in a tube:

6a Rootstock a creeping or erect rhizome; plants evergreen; pedicels hairy above:

7a Tepals with well-defined ascending claws and spreading limbs, outer tepals larger than inner; style branches broad and petal-like, compressed tangentially, terminating in paired erect crests; anthers appressed to abaxial side of style branches ..... **Dietes**

7b Tepals not clawed, inner and outer whorls subequal; style branches filiform, spreading horizontally; anthers ascending, alternating with style branches ..... **Bobartia**

6b Rootstock a corm; plants deciduous; pedicels without hairs near apices or pedicels lacking (flowers sessile):

8a Leaves unifacial, oriented edgewise to stem; corm persisting for some years, with membranous tunics or tunics 0; tepals with crisped edges; style branches terminating in a feathery, plumose tuft ..... **Ferraria**

8b Leaves bifacial or terete; corm resorbed annually, with fibrous tunics; tepals with plane edges; style branches not feathery and plumose, rarely so but then other characters not as above ..... **Moraea**

1b Flowers arranged in spikes, or flowers solitary on peduncles, sometimes in pseudopanicles, or acaulescent, individual flowers always sessile and style branches filiform, simple or deeply divided; flowers with tepals united below in a tube; rootstock a corm:

9a Outer and inner bracts membranous to scarious, usually translucent to transparent with veins often darkly coloured, occasionally outer solid below but then margins lacerate:

10a Plants acaulescent; leaves usually entirely bifacial, usually channelled to adaxially grooved, sometimes terete; bracts tubular below; corm tunics woody; flowers shades of blue to purple ..... **Syringodea**

10b Plants with stems aerial or acaulescent; leaves unifacial, oriented edgewise to stem, blades plane and linear to lanceolate or oval to terete in transverse section; bracts with margins free to base or united below; corm tunics woody or papery to fibrous; flowers variously coloured:

11a Leaves centric, oval in transverse section with 4 longitudinal grooves; flowers dusty pink, actinomorphic with stamens twisted anticlockwise; Roggeveld Escarpment (Northern Cape: Sutherland District); flowering in December ..... **Devia**

11b Leaves flat or rarely centric but then solid, without longitudinal grooves; flowers variously coloured, actinomorphic or zygomorphic, but stamens never twisted sideways:

12a Bracts pale, dry, papery and crinkled or solid, irregularly streaked with dark flecks or veins:

13a Flowers usually drooping, on wiry stems; leaves linear, narrow, tough and fibrotic; mostly summer-rainfall area, Humansdorp (Eastern Cape) to Ethiopia ..... **Dierama**

13b Flowers not drooping, upright or facing to side, on firm, somewhat succulent stems; leaves lanceolate, relatively succulent and without fibres; winter-rainfall area, Nieuwoudtville (Northern Cape) to Riversdale (Western Cape) ..... **Sparaxis**

12b Bracts pale or rust-coloured, membranous or dry, then not papery and crinkled, sometimes streaked with dark flecks or veins:

14a Flowers zygomorphic with stamens unilateral or tepals actinomorphic but stamens irregularly spreading and style eccentric; stems firm and relatively thick, never wiry ..... **Tritonia**

14b Flowers either actinomorphic with stamens erect and symmetrically disposed around a central style, or perianth regular but stamens unilateral with anthers drooping and with a right-angled bend near base; stems more or less wiry, branches, when present, usually held at right angles to main axis:

15a Plants acaulescent; outer floral bracts acute or attenuate; flowers bright yellow, with a long perianth tube and subterranean ovary; pollen grain apertures with a 2-banded operculum; Kimberley District (Northern Cape) ..... **Duthieastrum**

15b Plants with aerial stems; flowers variously coloured and ovary aerial, or rarely acaulescent with yellow flowers and an underground ovary, but then from southern Namaqualand (Northern Cape); outer floral bract obtuse and irregularly fringed; pollen grain apertures with a 1-banded operculum ..... **Ixia**

9b Outer and inner bracts green to brown and dry, soft-textured or firm to leathery, never lacerate, sometimes inner bracts with broad membranous to scarious margins:

16a Style branches dividing at apex of perianth tube or within tube, branches undivided, long and laxly spreading..... ..... **Hesperantha**

16b Style branches usually dividing well above mouth of perianth tube, branches simple or deeply divided, relatively short and spreading to recurved:

17a Corms bell-shaped, with a flat base; leaves plane or corrugate:

18a Ovary globose; style branches usually divided for ± half their length, rarely undivided or apically notched; leaves often corrugate, sometimes plane but then usually leathery in texture ..... **Lapeirousia**

18b Ovary deeply 3-lobed above; style branches undivided; leaves plane and soft-textured ..... **Melasphaerula**

17b Corms globose to obconic, round or pointed at base, or sometimes bell-shaped with a flat base but then leaves more or less terete and 4-grooved:

19a Style branches deeply divided, usually once, occasionally multifid:

20a Leaves terete to oval in transverse section with narrow longitudinal grooves, or 4-winged; corm tunics composed of brittle, woody concentric layers; flowers actinomorphic, solitary on branches, not arranged in spikes or plants acaulescent ..... **Romulea**

20b Leaves usually with plane blades or round in transverse section but without longitudinal grooves; corm tunics of coriaceous to fibrous layers; flowers zygomorphic or if actinomorphic then arranged in spikes and plants never acaulescent:

21a Flowers solitary on branches; leaves prostrate, soft in texture ..... **Xenoscapa**

21b Flowers arranged in erect or inclined spikes; leaves usually erect, occasionally prostrate, not noticeably soft in texture:

22a Spikes inclined to horizontal, flowers borne on upper side; bracts green or dry above, and then often dark brown at apices ..... **Freesia**

22b Spikes erect, flowers distichous or spirally arranged; bracts green or partly to entirely dry but then never dark brown at apices:

23a Flowers small, shorter than 12 mm, crowded on dense distichous spikes; bracts solid below with broad membranous margins ..... **Micranthus**

23b Flowers medium to large, usually at least 20 mm long, in distichous or spiral spikes; bracts without membranous margins:

24a Spikes distichous; leaf blades plane, relatively broad, margins moderately to strongly thickened; flowers never blue or purple, and perianth tube always curved, flowers thus facing to side ..... **Watsonia**

24b Spikes spiral; leaf blades rounded in section or plane but then narrow and without thickened margins; flowers shades of blue to nearly white or purple; perianth tube straight, flowers facing upward ..... **Thereianthus**

19b Style branches undivided or at most notched apically:

25a Inflorescence a panicle, individual flowers always with a peduncle; flowers actinomorphic, bright orange… ..... **Pillansia**

25b Inflorescence a simple or branched spike, flowers sessile, rarely inflorescence reduced to a single flower; flowers actinomorphic or zygomorphic, variously coloured:

26a Floral bracts fairly short, coriaceous and often partly to entirely dry at flowering time, inner bracts always substantially longer than outer; leaves sometimes with a long pseudopetiole, usually with more than one prominent vein, thus without a midrib ..... **Tritoniopsis**

26b Characters not combined as above:

27a Leaves several in a distichous fan, blades plane or plicate but then leaves, stems or bracts never pubescent; flowers shades of orange to scarlet; floral bracts short, ± twice as long as ovary, coriaceous, green or dry, nearly equal:

28a Flowers actinomorphic or zygomorphic but then perianth tube not abruptly expanded at top of lower cylindric portion and upper part not forming a pouch at base; seeds dark brown to blackish .... **Crocosmia**

28b Flowers zygomorphic, perianth tube narrow and cylindric below, abruptly expanded into a broad upper cylindrical part and pouched at base of upper part; seeds bright orange ..... **Chasmanthe**

27b Characters not combined as above:

29a Leaf blades pleated, sometimes ± linear and striate; stems and/or leaves or bracts pubescent to pilose ..... **Babiana**

29b Leaf blades plane, corrugated or rounded in transverse section with or without 4 longitudinal grooves; plants glabrous or sometimes pubescent on leaves and/or bracts:

30a Flowers actinomorphic or if zygomorphic then perianth actinomorphic and stamens unilateral and declinate; corm tunics usually composed of hard, brittle woody layers; seeds globose to somewhat angular ..... **Geissorhiza**

30b Flowers zygomorphic, tepals usually unequal and stamens unilateral and arcuate (actinomorphic in 2 species but then leaves without thickened margins and seeds winged); seeds either globose or winged:

31a Seeds globose; leaves soft-textured; stems lightly angled ..... **Radinosiphon**

31b Seeds usually with a broad circumferential wing, occasionally wing obsolete and seed irregularly angled to subglobose; leaves various, occasionally soft-textured but stem always round in section ..... **Gladiolus**

Aristea Aiton 1295000

(Nivenioideae)

Aiton: 67 (1789); Weimarck: 1 (1940a); Vincent: 214 (1985).

Evergreen herbs with short to long rhizomes. **Leaves** sword-shaped to linear or terete, distichous, crowded basally, usually a few also cauline. **Stem** rounded to compressed and 2-sided, or strongly winged, simple or branched, bearing reduced leaves below or leafless except for a subterminal leaflet. **Inflorescences** 1–many binate rhipidia (flower-clusters in 2 series, unless reduced to 1 or 2 flowers), either terminal on main and secondary axes or axillary, then stalked or sessile; spathes green or partly to entirely membranous or scarious, margins entire, irregularly torn or fringed; floral bracts (within spathes) membranous or scarious, entire, irregularly torn or fringed. **Flowers** actinomorphic, frequently sessile, fugaceous, usually dark blue, occasionally pale blue, white or mauve, occasionally with contrasting markings; each lasting a single day; perianth twisting spirally on fading, unscented; nectar produced in one species from perigonal nectaries. **Tepals** basally connate for 0.5–2.0 mm, usually subequal, in a few species outer tepals smaller than inner, lanceolate to ovate, usually spreading horizontally or sometimes ascending. **Stamens** erect, free; anthers oblong to linear, extrorse; pollen monosulcate, zonasulculate, 2-zonasulculate, or trisulcate, exine reticulate to areolate. **Ovary** ovoid to oblong or cylindric-trigonous, usually included in bracts. **Style** filiform, eccentric, dividing apically into 3 short stigmatic lobes, occasionally barely 3-fid, lobes entire or fringed. **Capsules** ovoid to oblong- or cylindric-trigonous, or broadly 3-winged, subsessile or stalked; remains of perianth usually persisting on capsules. **Seeds** rounded to angular, shortly cylindric, or compressed, or depressed and then oriented radially in locules, bearing a white basal elaiosome in 1 species, 2–many per locule, alveolate to smooth, matte, surface papillate to nearly laevigate, sometimes fringed when flattened. $x = 16$.

Species ± 52, most diverse in sthn Afr., extending to Senegal and Ethiopia in the north, and with 7 species in Madagascar; in the summer-rainfall area most frequent in well-watered highlands in grassland, rocky outcrops, or marshes; in the winter-rainfall area often montane and in rocky sandstone habitats, often flowering in mass after fires.

Pollen grains, capsules and seeds of the genus are unusually variable for the family. Flowers of most species open early in the morning and fade at midday or early in the afternoon and are pollinated by bees foraging for pollen. A few southwestern Cape species have flowers that are darkly marked and last an entire day and are pollinated by monkey beetles (Scarabaeidae). One species, *Aristea spiralis*, produces nectar and is thought to be pollinated by long-proboscid flies (*Philoliche*: Tabanidae) foraging for nectar.

Babiana Ker Gawl. 1310000

(Ixioideae)

Ker Gawler: t. 576 (1802a); Lewis: 20 (1959b); Goldblatt: 577 (1990c).

Acaste Salisb.: 322 (1812). *Anaclanthe* N.E.Br.: 269 (1932).

Deciduous perennials. **Rootstock** a globose corm rooting from below, basal in origin, tunics of tough coria-

ceous layers, or sometimes fibrous. **Stem** aerial or subterranean, usually terete or sometimes angled, often branched, usually hairy or scabrid, usually sheathed below by a neck. **Leaves** several, lower 2 or 3 cataphylls; foliage leaves unifacial, without a definite midrib, often abruptly expanded and oblique, blades plicate, ovate to linear, sometimes abruptly truncate, undulate, sinuate, or sometimes terete, usually pubescent or puberulent. **Inflorescence** a spike, flowers often secund, or spiral or distichous; bracts short or long, green with dry brown apices, rarely entirely dry, pubescent or glabrous, inner usually shorter than outer, usually forked apically or sometimes divided to base. **Flowers** usually zygomorphic and bilabiate or hypocrateriform, sometimes actinomorphic and funnel-shaped, often shades of blue or purple, sometimes yellow, red, pink or white, often with darker or pale markings on lower tepals, often sweetly fragrant, usually with nectar from septal nectaries; perianth tube short to long, cylindric and straight to curved or funnel-shaped. **Tepals** equal, subequal or unequal and dissimilar, then dorsal ones enlarged, hooded, reflexed or erect with margins involute and enclosing filaments, lower tepals sometimes ± clawed. **Stamens** symmetrically disposed and erect or unilateral and arcuate; filaments arising in mouth of tube; anthers exserted, occasionally connective very broad; pollen monosulcate, operculate, exine perforate. **Ovary** sometimes hairy. **Style** exserted or included, branches usually somewhat broadened above or slender throughout. **Capsules** globose to oblong, cartilaginous, sometimes hairy. **Seeds** globose with a prominently inflated funicle, rugose, usually shiny, surface laevigate. $x = 7$.

Species ± 68, sthn Afr. including Zimbabwe, mainly Western Cape and Namaqualand (Northern Cape), 1 species endemic on Socotra; most often on rocky sandstone or granite soils, but also clay soils in renosterveld.

Babiana is taxonomically isolated in Ixieae. It is distinguished by several specialised features including pseudopetiolate leaves, plicate leaf blades, pubescent to puberulent stems and leaves, and a basic chromosome number of $x = 7$. Many of the short-tubed species are pollinated by long-tongued bees, mostly Anthophoridae. The long-tubed species are pollinated by long-proboscid flies in the genera *Prosoeca* and *Moegistorhynchus* (Nemestrinidae). Some of the large, actinomorphic-flowered species are pollinated by monkey beetles (Scarabaeidae). Pollination by sunbirds occurs in 2 or 3 red-flowered species.

Bobartia L. 1284000

(Iridoideae)

Linnaeus: 54 (1753); Strid: 1 (1974).

Evergreen herbs, often growing in large tufts. **Rootstock** a creeping or erect rhizome. **Leaves** unifacial and linear or terete, then usually with narrow grooves alternating with veins, usually crowded together basally, tough and fibrotic, when unifacial without a distinct midrib. **Stem** branched or consisting of 1 long internode terminating in fascicles of rhipidia crowded together, these subtended by a subterminal leaf, usually terete or elliptic in section in 2 species. **Inflorescences** rhipidia, these occasionally single and terminal on branches or more often few to many crowded apically; spathes green and coriaceous or more or less dry, grey and chaffy, inner exceeding outer; floral bracts membranous. **Flowers** actinomorphic, fugaceous, several per rhipidium, borne serially, pedicellate, pedicels pubescent to villous above; usually yellow, blue in 1 species, probably unscented and without nectar. **Tepals** free or united below in a tube in 1 species, subequal, inner slightly smaller, not clawed. **Stamens**: filaments free, erect, often contiguous below; anthers erect, twisting when dry. **Ovary** ovoid to turbinate, sometimes tuberculate, usually exserted, occasionally included in spathes. **Style** slender and short, dividing into 3 long filiform style arms, these apically stigmatic and extending between stamens. **Capsules** woody, ovoid-truncate to turbinate, smooth or tuberculate. **Seeds** angular, rugose, surface areolate. $x = 10$.

Species 14, Western and Eastern Cape Provinces, mostly montane in rocky sandstone soils and often conspicuous after fires.

The genus was traditionally placed among New World and Australasian genera (tribe Sisyrinchieae) with which it shares close floral similarity. However, *Bobartia* is now regarded as a member of the Old World tribe Irideae and closely related to *Dietes*. The flowers appear to be adapted for pollination by bees foraging for pollen.

Chasmanthe N.E.Br. 1306030

(Ixioideae)

Brown: 273 (1932); De Vos: 256 (1985); De Vos: 143 (1999).

Deciduous perennials. **Rootstock** a depressed globose corm rooting from below, basal in origin, tunics firm-papery, sometimes becoming coarsely fibrous. **Stem** aerial, terete, simple or branched. **Leaves** several, lower 2 or 3 cataphylls, foliage leaves unifacial, with a definite midrib composed of more than one pair of veins, mostly basal and forming distichous fan, blades lanceolate to sword-shaped, plane, cauline leaves few and reduced. **Inflorescence** a spike, flowers distichous or secund, usually many and crowded; bracts small, green, becoming dry at tips, firm-textured, inner as long or shorter than outer and notched apically. **Flowers** zygomorphic, orange, lower tepals with contrasting markings or green, unscented, with nectar from septal nectaries; perianth tube long, cylindric below and sometimes spirally twisted, expanded abruptly and tubular and horizontal above. **Tepals** unequal and dissimilar, dorsal largest, extended horizontally and concave, remaining tepals much smaller, usually recurved. **Stamens** unilateral and arcuate; filaments arising at base of upper part of tube, lower one slightly longer than other two; anthers parallel, subversatile; pollen monosulcate, operculate, exine perforate. **Style** long-exserted, horizontal, branches filiform. **Capsules** globose, coriaceous, sometimes purple on inside. **Seeds** globose, usually 2 per locule, raphal vascular trace excluded, orange, shiny and smooth when fresh, coat sometimes fleshy, then wrinkled on drying, surface laevigate. $x = 10$.

Species 3, Western Cape to Transkei (Eastern Cape), usually in bush, or forest margins.

Chasmanthe is doubtfully distinct from the related *Crocosmia* although the 2 differ in seed features and in their basic chromosome numbers. The bright orange seeds of *Chasmanthe* are thought to be adapted to bird dispersal. The flowers are pollinated by sunbirds and the flowers have the red to orange colour, the exserted anthers, long perianth tube, extended upper tepal and reduced lower tepals typical of bird-pollinated flowers in Iridaceae.

Crocosmia Planch. 1306010

(Ixioideae)

Planchon: 161 (1851); De Vos: 474 (1984); Goldblatt & Manning: 59 (1990b); De Vos: 129 (1999).

Curtonus N.E.Br.: 270 (1932).

Deciduous perennials. **Rootstock** a depressed globose corm rooting from below, those of past seasons often not resorbed, basal in origin, producing thin rhizomes from base in some species, tunics firm-papery, sometimes becoming fibrous with age. **Stem** aerial, terete, rarely ridged, simple or branched, sometimes repeatedly and then strongly flexuose. **Leaves** several, lower 2 or 3 cataphylls; foliage leaves unifacial, usually with a definite midrib composed of more than one pair of veins, mostly basal and forming a distichous fan, blades lanceolate to sword-shaped, or plicate with several equal veins, cauline leaves few and reduced. **Inflorescence** a

spike, flowers distichous or secund, usually many and crowded, sometimes strongly flexuose; bracts small, green, becoming dry at tips, firm-textured, inner ± as long as outer and notched apically. **Flowers** zygomorphic and funnel-shaped to tubular or actinomorphic, hypocrateriform and nodding, shades of orange to red, lower tepals sometimes with contrasting markings, unscented, with nectar from septal nectaries; perianth tube cylindric or funnel-shaped, widening gradually and flared or tubular above. **Tepals** equal or unequal and dissimilar, then dorsal largest. **Stamens** unilateral and arcuate or symmetrically disposed and central; filaments arising at base of throat, included to well exserted; anthers parallel, subversatile; pollen monosulcate, operculate, exine perforate. **Style** exserted, ascending or horizontal, branches filiform or expanded apically, sometimes notched apically. **Capsules** globose, coriaceous, often warty above, sometimes reddish to orange on inside. **Seeds** globose, usually 2 per locule, brown or blackish, shiny and smooth when fresh, coat at least sometimes fleshy and wrinkled on drying, surface laevigate, raphal vascular trace excluded. $x = 11$.

Species 9, mostly SE Africa, 1 endemic in Namaqualand (Northern Cape) and 1 endemic in Madagascar (Goldblatt & Manning 1990b); mostly in grassland or forest margins, the Namaqualand species in shade in riverine scrub.

Crocosmia is closely allied to *Chasmanthe* and both are allied to *Tritonia*, a genus which differs in having softer-walled capsules with several small, hard seeds per locule and often 1 or more of the lower tepals with a prominent tooth-like callus. The species with short-tubed flowers are pollinated by long-tongued bees while those with long-tubed flowers are pollinated by sunbirds.

Devia Goldblatt & J.C.Manning 1306090

(Ixioideae)

Goldblatt & Manning: 362 (1990a); Goldblatt: 149 (1999).

Deciduous perennials. **Rootstock** a depressed-globose corm rooting from below, basal in origin, tunics of coarse fibres accumulating in a dense mass. **Stem** aerial, branched, terete, sheathed below by a thick, coarsely fibrous neck. **Leaves** several, lower 2 or 3 cataphylls; foliage leaves unifacial, with a definite midrib, mostly basal, linear, oval in transverse section, midrib and a second pair of veins on either side heavily thickened, surface thus with 2 narrow longitudinal grooves on each surface, margins unthickened, edged by narrow grooves, dry or becoming dry at flowering time, cauline leaves few and reduced. **Inflorescence** a spike, flowers secund; bracts coriaceous, dry at anthesis, inner ± as long as outer and notched apically. **Flowers** actinomorphic, trumpet-shaped, pink, unscented, with nectar from septal nectaries; perianth tube narrowly funnel-shaped. **Tepals** subequal, suberect, enclosing filaments. **Stamens** symmetrically disposed, rotated counterclockwise; filaments arising in throat; anthers opposite inner tepals, facing inward, exserted from flower; pollen monosulcate, operculate, exine perforate. **Style** eccentric, branches short, notched apically. **Capsules** globose, cartilaginous, lightly verrucose above. **Seeds** globose, flattened at chalazal end, hard and shiny, 1 or 2 per locule, smooth, surface laevigate, raphal vascular trace excluded. $x = 10$.

Species 1, Roggeveld Escarpment in the western Karoo (Northern/Western Cape), on clay soils in mountain renosterveld; unusual in flowering in the summer in this area of low, predominantly winter rainfall.

Perhaps most closely allied to *Crocosmia*, *Devia* is distinctive in its longitudinally grooved, narrow leaves, pink perianth and rotated stamens. It differs in all these features, as well as in its base number of $x = 10$, from *Crocosmia* but has internal leaf anatomy and capsule and seed characters that are consistent with this genus and its allies, *Chasmanthe* and *Tritonia*. The inconspicuous flowers are visited and presumably pollinated by various long-tongued insects including flies in the family Bombyliidae and bees in the family Anthophoridae.

Dierama K.Koch 1303000

(Ixioideae)

Koch: 10 (1855); Hilliard, Burtt & Batten: 41 (1991).

Evergreen perennials, sometimes growing in clumps. **Rootstock** a depressed-globose corm rooting from below, those of past seasons often not resorbed, basal in origin, tunics coarsely fibrous, often accumulating in a dense mass. **Stem** aerial, terete, thin and wiry, usually with several branches, often drooping above, sometimes erect, subtending bracts dry and thread-like. **Leaves** several, lower 2 or 3 cataphylls, these often dry and becoming fibrous; foliage leaves unifacial, often without a definite midrib in mature plants, plane, linear, coriaceous and fibrotic. **Inflorescence** a spike, axes wiry, usually drooping, occasionally erect; bracts dry, usually papery and translucent, occasionally solid, becoming lacerate above and usually brown-streaked or flecked, sometimes caudate, inner bracts smaller than outer and forked apically. **Flowers** actinomorphic and campanulate, usually nodding, often shades of pink to mauve, also red, purple, yellow or white, usually with small markings near tepal bases, unscented, with nectar from septal nectaries; perianth tube funnel-shaped, fairly short. **Tepals** subequal, cupped and often enclosing stamens and often style. **Stamens** symmetrically disposed and central; filaments arising in throat; anthers exserted from tube, sometimes barely so; pollen monosulcate, operculate, exine perforate. **Style** exserted from tube, seldom from perianth, branches short, slender, slightly expanded above and recurved. **Capsules** globose, cartilaginous. **Seeds** globose or lightly angled, flattened at chalazal end, smooth, hard, often shiny, surface laevigate, raphal vascular trace excluded. $x = 10$.

Species 44, mostly in the summer-rainfall region in grassland, extending from Knysna (Western Cape) to Ethiopia, centred in eastern sthn Afr., and there both coastal and montane.

Dierama is recognised by the wiry, usually drooping spikes, pendent regular flowers and dry, either solid or scarious floral bracts, generally pale with brown streaks and veins. The genus is closely allied to the sthn Afr. *Ixia*, restricted to the winter-rainfall region. The flowers are pollinated by bees.

Dietes Salisb. ex Klatt 1265010

(Iridoideae)

Klatt: 583 (1866) name conserved; Goldblatt: 141 (1981a); 8 (1993b).

Naron Medik.: 419 (1790) name rejected. *Moraea* subgenus *Dietes* (Salisb. ex Klatt) Baker: 48 (1892); 11 (1896).

Evergreen herbs with a thick, creeping rhizome, persisting for several years. **Leaves** several, ensiform, distichous, coriaceous, lanceolate, without a midrib, veins along centre of leaf sometimes crowded together. **Stem** usually erect, bearing leaves at lower nodes, persisting for more than one season, with sheathing leaves at upper nodes; branching irregularly in upper half, or forming a divaricately branched panicle. **Inflorescences** rhipidia, these terminal on branches; spathes coriaceous, tightly sheathing, outer smaller than inner. **Flowers** actinomorphic, usually fugaceous or lasting up to 3 days in one species, several per rhipidium, borne serially, pedicels pubescent above; *Iris*-like, shades of white to yellow, style branches sometimes violet, limbs of outer tepals bearing contrasting markings near their bases, unscented, without nectar. **Tepals** free, broadly unguiculate, claws ascending, limbs spreading, outer tepals larger than inner, with pubescent claws. **Stamens**: filaments usually free, flattened and broader below, occasionally united below; anthers linear, appressed to style branch. **Ovary** oblong to turbinate. **Style** dividing shortly above base into 3 broad petaloid branches op-

posed to outer tepals, each branch terminating in a pair of erect petaloid appendages (crests); stigmas transverse, abaxial, below base of crests. **Capsules** oblong to broadly ovoid or nearly hemispherical, apex truncate, cartilaginous to woody, irregularly rugose or smooth, tardily dehiscent or indehiscent, erect or pendent. **Seeds** irregularly angled, fairly large, with a chalazal crest, rugulose, surface areolate. $x = 10$ (polyploidy).

Species 6, 1 widespread species in eastern Africa, 1 on Lord Howe Island, Australasia; 5 in sthn Afr.

Dietes is closely related to the northern hemisphere *Iris* and differs from it largely in having flowers without a perianth tube and the inner tepal limbs spreading rather than erect. The flowers are probably pollinated mainly by bees. The geographic disjunction in the genus between Africa and Lord Howe Island is remarkable. The Lord Howe Island species, *D. robinsoniana* and the Eastern Cape *D. bicolor* are closely allied and primitive in the genus. All the species grow in partly shaded habitats, often on forest margins or on the forest floor. *D. bicolor* grows along perennial streams or rivers.

Duthieastrum M.P.de Vos 1306020

(Ixioideae)

De Vos: 91 (1975); De Vos: 139 (1999).

Duthiella M.P.de Vos: 301 (1974b), name illegitimate, not of Müll.Hal. ex Broth.

Deciduous perennial. **Rootstock** a globose corm rooting from below, basal in origin, tunics of fine, reticulate fibres. **Stem** subterranean, branched below ground. **Leaves** several, lower 2 or 3 cataphylls; foliage leaves unifacial, with a definite midrib, in a tight distichous fan, blades plane. **Inflorescence** subterranean, simple or branched, flowers 1 or 2 per branch; bracts membranous, concealed by leaves, inner slightly shorter than outer and notched apically. **Flowers** actinomorphic, hypocrateriform, yellow, unscented, with nectar from septal nectaries; perianth tube elongate, cylindric. **Tepals** subequal, spreading. **Stamens** symmetrically disposed, erect; filaments arising at mouth of tube; anthers exserted; pollen monosulcate, operculate, exine perforate. **Ovary** subterranean. **Style** filiform, exserted, branches slender, undivided and recurved. **Capsules** club-shaped, sterile and shortly tubular below, cartilaginous. **Seeds** globose, flattened at chalazal end, smooth, shiny, raphal vascular trace excluded. $x = 10$.

Species 1, northern Karoo (Northern Cape).

The affinities of *Duthieastrum* lie with *Tritonia* or *Sparaxis*, both according well in vegetative appearance, corm tunics, and leaf anatomy. The leaves lack subepidermal sclerenchyma and the marginal epidermal cells hardly differ from those of the lamina. Some species of *Tritonia* have similar marginal epidermis while others have thickened, columnar marginal epidermal cells as do all species of *Sparaxis*. The yellow flowers open in the afternoon and close shortly after dark each day.

Ferraria Burm. ex Mill. 1272000

(Iridoideae)

Miller: 187 (1759); De Vos: 327 (1979).

Deciduous perennials. **Rootstock** a persistent, apically rooting corm, new corms produced from base of flowering stem, older corms not resorbed, accumulating below current corm; tunics membranous, evanescent, usually lacking in preserved material. **Stem** erect, short or long, usually covered by overlapping leaf sheaths, or partly exposed, sticky below nodes in 1 species, usually branched, branches usually crowded in upper half. **Leaves** unifacial, sword-shaped to linear or falcate, thick and somewhat succulent, usually glaucous, usually without a central vein. **Inflorescences** rhipidia, terminal on long branches or crowded near apex on short branches; spathes resembling leaves in texture and colour, inner exceeding outer. **Flowers** fugaceous or lasting up to 3 days, pedicellate, included in spathes, 2–6 per rhipidium, often dull shades of brown to yellow, occasionally blue, usually mottled with darker colour, tepal limb margins lighter or darker, often unpleasantly scented, or sweetly scented of vanilla, with perigonal nectaries at tepal bases. **Tepals** free, subequal or outer slightly larger than inner, clawed, claws forming a wide cup, limbs spreading horizontally or somewhat below horizontal, margins crisped. **Stamens**: filaments united below in a column around style, free above and spreading; anthers appressed to style branches, thecae oval, parallel or divergent; pollen monosulcate, exine reticulate. **Ovary** ovoid-truncate to narrowly oblong, tapering above, sometimes extending upward in a sterile tubular beak. **Style** filiform, dividing above filament column, branches short, deeply divided into 2 flattened lobes, these each with an abaxial stigma lobe and divided terminally into fringed crests. **Capsules** oblong to ellipsoid, with short to long acute apices. **Seeds** globose or angled by pressure, more or less rugose, surface smooth. $x = 10$ (polyploidy).

Species 11, south tropical Africa to the S Cape, centred along the west coast of South Africa (Northern and Western Cape), mostly in sandy soils.

Ferraria is a taxonomically isolated genus characterised by corms that lack a visible tunic and by dull flowers with fringed style crests.

Although pollination has not been critically studied, species are known to be pollinated by a variety of carrion flies, including Calliphoridae and Muscidae, attracted by the foetid or spicy scent and dull colouration. *F. farrariola* seems an exception in the genus in having the flowers pollinated by honey bees.

Freesia Klatt 1316000

(Ixioideae)

Klatt: 672 (1866) name conserved; Goldblatt: 55 (1982); Goldblatt & Manning: 161 (1995b).

Anomatheca Ker Gawl.: 227 (1804); Goldblatt: 75 (1972).

Deciduous perennials. **Rootstock** an obconic corm rooting from below, basal in origin, tunics finely to coarsely fibrous. **Stem** aerial, erect, or prostrate below, simple or branched, terete or compressed and angled. **Leaves** several, lower 2 or 3 cataphylls; foliage leaves unifacial, with a distinct midrib, in a distichous fan, blades plane, firm or soft-textured, sometimes prostrate. **Inflorescence** a spike, flexed at base, flowers borne on upper side; bracts green and soft-textured or coriaceous, often brown at apices, inner shorter than outer, notched apically. **Flowers** zygomorphic, hypocrateriform or narrowly to widely funnel-shaped, shades of white to yellow or pink to red, rarely greenish to brown, sometimes with contrasting darker markings on lower 3 tepals, usually strongly and sweetly scented, nectar, when produced, from septal nectaries; perianth tube either slender and cylindric throughout or narrow below, widened into a narrowly or broadly flared upper part. **Tepals** subequal or dorsal larger and hooded. **Stamens** unilateral and arcuate; filaments arising at base of wide part of tube; anthers included or exserted; pollen monosulcate, operculate, exine perforate. **Style** filiform, branches deeply divided and recurved. **Capsules** ± globose, coriaceous, usually papillate to rugose. **Seeds** globose, hard, shiny, smooth or rugulose, raphe inflated, flattened or concave at chalazal end, surface laevigate. $x = 11$.

Species 14, mainly in the sthn Afr. winter-rainfall region, 2 species in E South Africa and south tropical Africa, 1 extending to Sudan. Most common in clay soils in renosterveld or karroid scrub. The 2 species of the summer-rainfall region occur in light shade in woodland or forest margins.

The genus is probably allied to *Tritonia* and *Crocosmia*. The often highly scented flowers are mostly pollinated by bees, while the narrow-tubed unscented species are visited by butterflies and possibly moths.

Geissorhiza Ker Gawl. 1300000

(Ixioideae)

Ker Gawler: 223 (1804); Goldblatt: 302 (1985).

Sphaerospora Klatt: 725 (1863) name illegitimate not of Sweet ex Loudon (1841). *Engysiphon* G.J.Lewis: 19 (1941).

Deciduous perennials. **Rootstock** a corm, globose to ovoid and asymmetric or campanulate, usually with a basal ridge from which roots emerge, basal in origin, tunics woody, or rarely membranous to fibrous, concentric or imbricate, then notched below. **Stem** aerial, simple or branched, terete in section, sometimes puberulous or scabrid, drooping in bud. **Leaves** few to several, lower 2 or 3 cataphylls; foliage leaves 2 to several, unifacial, usually with a definite midrib, blades plane to terete or H-shaped in section, sometimes margins and/or midrib raised and winged, sometimes hairy or sticky. **Inflorescence** a spike, rarely flowers solitary on branches, flowers usually spirally arranged; bracts green and soft-textured to membranous, inner smaller than outer and notched apically. **Flowers** actinomorphic or zygomorphic, rotate to hypocrateriform, variously coloured, often shades of blue to violet, also pink, yellow, cream, purple, red or bicoloured, unscented, sometimes with nectar from septal nectaries; perianth tube short to long, funnel-shaped or cylindric. **Tepals** subequal, inner usually shorter than outer, cupped or spreading from base. **Stamens** symmetrically disposed or unilateral and declinate; filaments filiform, sometimes of unequal length, one shorter than other two, arising at mouth of tube or well inside tube; anthers erect or ascending, rarely included; pollen monosulcate, operculate, exine perforate. **Style** filiform, central, eccentric or unilateral and held below stamens, usually exserted, branches usually slender and recurved, or broadly expanded above. **Capsules** globose to oblong or cylindric, membranous to cartilaginous. **Seeds** angular to globose, flattened at chalazal end, smooth or rugulose, matte, surface colliculate or areolate. $x = 13$.

Species 84, Namaqualand and western Karoo (Northern Cape) to Eastern Cape, mostly Western Cape.

Geissorhiza and the allied *Hesperantha* are distinguished in Ixioideae by their unusual woody corm tunics, and corms with a basal ridge from which the roots arise. They also share the unusual base number. *Geissorhiza* is the less specialised of the two and difficult to define except in relation to *Hesperantha*. There are two subgenera, *Weihea* with concentric, and *Geissorhiza* with derived, imbricate corm tunics. Adaptive radiation in *Geissorhiza* is extensive with species adapted to a variety of habitats and pollinators. Notable are a number of species that occur only on cliffs close to or under waterfalls. The phytogeography corresponds closely to the classic model for members of the Cape flora. The majority of species are more or less generalists pollinated by various bees and hopliine beetles but those with pale pink, long-tubed flowers are pollinated by long-proboscid flies (Tabanidae and Nemestrinidae).

Gladiolus L. 1311000

(Ixioideae)

Linnaeus: 36 (1753); Baker: 198 (1892); Baker: 135 (1896); Goldblatt: 66 (1993b); Goldblatt: 1 (1996); Lewis *et al.*: 1 (1972); Goldblatt & De Vos: 417 (1989); Goldblatt & Manning (1998).

Antholyza L.: 37 (1753); Baker: 6 (1896); Brown: 265 (1932); not including the type. *Cunonia* Mill.: 75 (1759) name rejected versus *Cunonia* L., name conserved. *Anisanthus* Sweet: 566 (1830). *Petamenes* Salisb. ex J.W.Loudon: 42 (1841); Brown: 276 (1932); Phillips: 44 (1941). *Sphaerospora* Sweet ex J.W.Loudon: 66 (1841). *Acidanthera* Hochst.: 25 (1844); Baker: 130 (1896). *Ballosporum* Salisb.: 142 (1866). *Homoglossum* Salisb.: 143 (1866); De Vos: 326 (1976). *Hyptissa* Salisb.: 142 (1866). *Ranisia* Salisb.: 143 (1866). *Symphydolon* Salisb.: 142 (1866). *Oenostachys* Bullock: 465 (1930). *Anomalesia* N.E.Br.: 270 (1932). *Kentrosiphon* N.E.Br.: 271 (1932).

Deciduous perennials, evergreen in one species. **Rootstock** a corm rooting from base, basal in origin, tunics coriaceous to papery or membranous to fibrous. **Stem** aerial, terete or occasionally compressed and angled, simple or branched, often flexuose, occasionally scabrid to puberulous. **Leaves** few to many, lower 3 cataphylls; foliage leaves unifacial, usually with a definite midrib, 2 to several, basal or some arising above ground level, sometimes blade reduced or lacking, thus entire leaf partly to entirely sheathing, blades linear to lanceolate, sometimes puberulous or hairy, either plane and with margins, midrib, and sometimes other veins not or only lightly thickened and hyaline, or margins or midrib strongly raised, sometimes even winged (thus H- or X-shaped in section), or midrib and margins much thickened and blade apparently terete but with four narrow longitudinal grooves; usually contemporary with flowers, occasionally borne earlier or later than flowers and on separate shoots. **Inflorescence** a spike, flowers usually secund, occasionally distichous; bracts green, sometimes dry above or entirely, usually relatively large, inner usually slightly smaller than outer, notched apically for 1–2 mm or entire. **Flowers** zygomorphic, actinomorphic in a few species, rotate, campanulate to hypocrateriform or tubular, often bilabiate, lower tepals usually with contrasting markings constituting a nectar guide; stamens arcuate and unilateral, ascending to horizontal, or symmetric in actinomorphic species, style arched over them; frequently closing at night, often fragrant, with nectar from septal nectaries; perianth tube obliquely funnel-shaped to cylindric, shorter or longer than bracts. **Tepals** usually unequal, dorsal broader and arched to hooded over stamens, lower three narrower, sometimes clawed below and united for a short distance, as long, shorter than, or exceeding upper tepals. **Stamens**: filaments filiform, arising at base of upper part of perianth tube, usually exserted but occasionally extending only to mouth of tube, occasionally puberulous; anthers subbasifixed, occasionally centrifixed, rarely with sterile tails; pollen monosulcate, operculate, exine perforate. **Style** filiform, exserted, branches undivided, slender below, expanded gradually or abruptly above and often bilobed apically. **Capsules** usually slightly inflated, often large, ovoid to ellipsoid. **Seeds** usually discoid with a broad circumferential wing, rarely globose to angled, smooth, matte, surface colliculate on seed body, areolate on wing. $x = 15$ (14, 12, 11) (high polyploidy).

Species ± 260, South Africa through tropical Africa and Madagascar to Europe and the Middle East; ± 165 in sthn Afr., centred in the Western Cape with secondary centres in the eastern sthn Afr. highlands.

Second largest genus of the family after *Iris*, *Gladiolus* is one of few genera of Ixioideae that have radiated conspicuously outside the Cape region. The affinities of the genus are uncertain but there is no doubt that it is monophyletic, being defined by its specialised winged seeds, possibly by the apically expanded style branches, and the ancestral basic chromosome number. Pollination by long-tongued bees, mostly Anthophoridae, is most common. The long-tubed red-flowered species are pollinated by sunbirds, or in a few instances (e.g. *G. cardinalis*) by the butterfly *Aeropetes tulbaghia*. Long-tubed white- or brown-flowered species, scented throughout the day or only in the evenings, are pollinated by a range of moths while long-tubed pink- or white-flowered species with red markings are pollinated by the long-proboscid flies *Moegistorhynchus*, *Prosoeca* (both Nemestrinidae) or *Philoliche* (Tabanidae). Floral diversity, and the different pollination syndromes, are matched by numerous vegetative adaptations, notably reduction in leaf number and development of winged midribs and/or margins, or reduction of the entire leaf blade. In some species flowering occurs before the leaves are produced or after they have dried.

Hesperantha Ker Gawl. 1301000

(Ixioideae)

Ker Gawler: 224 (1804); Goldblatt: 40 (1984c); 134 (1986b); 459 (1987b); 59 (1993b); Hilliard & Burtt: 407 (1986); Goldblatt & Manning: 262 (1996).

Schizostylis Backh. & Harv.: t. 5422 (1864).

Deciduous perennials. **Rootstock** a corm, rarely reduced and rhizome-like, globose to ovoid or campanulate with

a flat base, sometimes with a basal ridge from which roots emerge, basal in origin, tunics woody, or rarely firm-papery, concentric or imbricate and then notched below. **Stem** aerial or subterranean, simple or branched, terete in section. **Leaves** few to several, lower 2 or 3 cataphylls; foliage leaves unifacial, with a definite midrib, 2–several, blades plane to terete, sometimes margins and or midrib thickened, sometimes hairy. **Inflorescence** a spike, flowers spirally arranged, rarely solitary; bracts green and soft-textured, inner smaller than outer and notched apically. **Flowers** usually actinomorphic, rarely zygomorphic, rotate to hypocrateriform or nodding, variously coloured, mostly white or pink, also yellow or blue to violet or red, often fragrant and then usually in evening, with nectar produced from septal nectaries; perianth tube cylindric, short or long, sometimes curved near apex. **Tepals** subequal, spreading, sometimes recurved. **Stamens** symmetrically disposed or rarely unilateral and declinate; filaments arising shortly below mouth of tube, sometimes very short, erect or drooping; anthers erect and facing inward or articulated on filament apices and horizontal, sometimes drooping, occasionally included in tube; pollen monosulcate, operculate, perforate. **Style** filiform, dividing at or below mouth of tube, branches filiform, long and spreading, erect when included in tube, stigmatic along their entire length. **Capsules** membranous, globose to oblong or cylindric, sometimes dehiscing only in upper third. **Seeds** globose to angular, flattened at chalazal end, sometimes lightly winged on angles, smooth or rugulose, matte, surface colliculate or areolate. $x = 13$ (polyploidy).

Species ± 75, SW Western Cape to Ethiopia, with major centres of diversity in the southwestern Cape, the western Karoo and the Drakensberg (Mpumalanga, KwaZulu-Natal, Eastern Cape, Lesotho).

The presumed close relationship between *Hesperantha* and *Geissorhiza* has been discussed above. *Hesperantha* is specialised in its moderately long perianth tube, style dividing at the mouth of the tube, spreading filiform style branches and inwardly twisted anthers. Although white to cream flowers that open in the late afternoon and evening are probably basic for the genus, and are most common in the winter-rainfall region, there are several day-blooming species in that region, and most of the species in the summer-rainfall area are also day-blooming, with pink flowers. Although many species are pollinated primarily by small moths, pollination in *Hesperantha* has been little studied. Even species with white flowers opening in the late afternoon are often pollinated by long-tongued bees during the day. The long-tubed pink- or purple-flowered species in Namaqualand and the Drakensberg are pollinated by long-proboscid flies of the genera *Prosoeca and Stenobasipteron*. *Hesperantha coccinea*, long regarded as a separate genus, *Schizostylis*, has all the taxonomically critical features of *Hesperantha*, including a basic chromosome number of $x = 13$, except for a rhizome-like rootstock, anomalous in Ixioideae. The plant produces cormlets in the upper leaf axils of a shape typical for *Hesperantha* and it seems likely that the rhizome is a reversal from a corm, and associated with its wetland habitat. Comparable reduction of the corm has occurred in a few species of *Gladiolus* and *Geissorhiza*.

Ixia L. 1302000

(Ixioideae)

Linnaeus: 23 (1762); Lewis: 58 (1962); De Vos: 3 (1999).

Houttuynia Houtt.: 448 (1780) name rejected, not of Thunberg. *Dichone* Salisb. : 320 (1812). *Morphixia* Ker Gawl.: 105 (1827).

Deciduous perennials. **Rootstock** a globose corm rooting from below, basal in origin, tunics of fine to moderately coarse fibres. **Stem** aerial, rarely subterranean, usually slender and wiry, terete, usually branched, branching often divaricate. **Leaves** several, lower 2 or 3 cataphylls; foliage leaves unifacial, with a definite midrib, blades usually plane, rarely H-shaped in transverse section with winged margins, sword-shaped, falcate or linear, sometimes margins thickened, occasionally crisped. **Inflorescence** a spike, flowers spirally arranged, occasionally distichous, often flexuose; bracts membranous, occasionally scarious, short, outer usually 3-cuspidate, inner smaller than outer and bicuspidate. **Flowers** usually actinomorphic, rarely somewhat zygomorphic, variously coloured, pink, mauve or yellow, sometimes darker in centre, sometimes fragrant, sometimes with nectar from septal nectaries; perianth tube funnel-shaped or filiform throughout, short or elongate. **Tepals** subequal, usually spreading. **Stamens** symmetrically disposed, arising in throat or at top of tube; filaments included or well exserted, sometimes partly or entirely united; anthers diverging or contiguous, sometimes incompletely dehiscent, occasionally with a bend near base; pollen monosulcate, operculate, exine perforate. **Style** included or exserted, dividing at or well above mouth of tube, branches slender, channelled and slightly broadened above or involute and stigmatic apically. **Capsules** globose, cartilaginous. **Seeds** globose or lightly angled, smooth or ruminate, hard, shiny, surface more or less laevigate, raphal vascular trace excluded. $x = 10$ (polyploidy).

Species ± 50, mainly in the winter-rainfall region, extending from Namaqualand (Western Cape) and the western Karoo through the southwestern Cape region into the Eastern Cape; most diverse in the SW Western Cape.

Evidently specialised in Ixieae in its dry bracts and actinomorphic flowers, *Ixia* was considered by Lewis (1962) to be closely related to *Dierama*. *Ixia* has a strongly Western Cape distribution with few species extending to the extremes of its range in the north or east. Subgenus *Dichone* is distinctive in its unusual, short filaments, small inflated anthers and conduplicate style branches. Less specialised species of the genus are pollinated by bees but in section *Ixia*, the flowers of which have a narrow, closed perianth tube and dark central markings, most species are pollinated by monkey beetles (Scarabaeidae). *Ixia paniculata* is pollinated by the long-proboscid flies, *Moegistorhynchus longirostris* (Nemestrinidae) and *Philoliche rostrata* (Tabanidae). Other long-tubed species, including *I. bellendenii* and *I. pauciflora*, are pollinated by *Philoliche rostrata*. Buzz-pollination appears to be characteristic of several species of subgenus *Dichone*.

Klattia Baker 1298000

(Nivenioideae)

Baker: 109 (1878); Goldblatt: 99 (1993a).

Evergreen shrubs, with a woody underground caudex and woody aerial stems. **Stems** upright or inclined, compressed, becoming rounded below, brittle and woody (with secondary growth), marked with leaf scars, main axes simple, sparsely branched. **Leaves** sword-shaped, crowded apically, distichous, upper leaves below inflorescences broad and pale or dark red. **Inflorescence** compound and capitate, with 2-flowered binate rhipidia crowded at stem apex, enclosed below by enlarged leaves, these greenish, yellow or red; binate rhipidia subtended by a short bract and opposed prophyll, 2-flowered; spathes membranous, acute; floral bracts membranous, 2-keeled, shorter than spathes. **Flowers** sessile, actinomorphic, crowded, red, yellow or purplish black with pale claws, unscented, with nectar produced from septal nectaries; perianth tube cylindric, short, filled to overflowing with nectar. **Tepals** linear-spathulate, much exceeding tube, unguiculate, claws linear, limbs narrowly oblong and cucullate. **Stamens**: filaments flattened below, filiform above, extending well beyond tube; anthers linear, subbasifixed, connective pouched below around filament apex; pollen monosulcate, exine reticulate. **Ovary** globose, domed above insertion of tepals, enclosing enlarged septal nectaries, locules 2-ovulate. **Style** filiform, reaching to just below or just beyond tepal apices, shortly 3-notched apically. **Capsules** fusiform, more or less woody. **Seeds** tangentially compressed and shield-shaped, 1 per locule, lineolate, smooth, surface cells fusiform. $x = 16$.

Species 3, Western Cape mountains from Bain's Kloof to Riversdale, 500–1500 m, mainly damp sites in rocky sandstone soils.

The flowers are pollinated by sunbirds which feed on the ample amounts of nectar produced.

Lapeirousia Pourr. 1314000

(Ixioideae)

Pourret: 79 (1788); Goldblatt: 1 (1972); 430 (1990b); Goldblatt & Manning: 326 (1992).

Ovieda Spreng.: 258 (1817). *Peyrousia* Poir.: 363 (1826). *Meristostigma* A.Dietr.: 593 (1833). *Sophronia* Licht. ex Roem. & Schult.: 482 (1817). *Chasmatocallis* R.C.Foster: 40 (1939).

Deciduous perennials. **Rootstock** a bell-shaped corm with a flat base, rooting from edge of flat base, axillary in origin, tunics of densely compacted fibres or woody. **Stem** aerial or subterranean, compressed and angled to winged, usually branched, sometimes repeatedly. **Leaves** several, lower 2 or 3 cataphylls; foliage leaves unifacial, sometimes with a definite midrib, few, sometimes solitary, lowermost longest and arising on stem near ground level, upper leaves cauline and progressively smaller, blade either plane, or shallowly plicate-corrugate, or terete. **Inflorescence** either a simple to branched spike, or panicle-like, then usually ultimate branches with sessile flowers, or flowers clustered at ground level in a basal tuft; bracts green and firm to soft-textured, outer sometimes ridged, keeled, crisped or toothed, inner shorter than outer and notched or forked apically. **Flowers** zygomorphic or actinomorphic, campanulate to hypocrateriform, blue, purple, red, pink or white, lower or all tepals usually with contrasting darker or lighter markings, sometimes sweetly scented, with nectar from septal nectaries; perianth tube cylindric or campanulate, short to extremely long. **Tepals** subequal or unequal and bilabiate. **Stamens** symmetrically disposed around style or unilateral and arcuate; filaments arising shortly below mouth of tube; anthers exserted; pollen monosulcate, operculate, exine perforate. **Style** filiform, exserted, branches usually forked for up to half their length, occasionally entire or barely forked. **Capsules** membranous to cartilaginous, ± globose. **Seeds** ± globose, flattened at chalazal end, smooth, rugulose or reticulate, matte, surface usually colliculate, sometimes areolate. $x = 10$ (9, 8, 7, 6, 5, 4, 3).

Species 40, 35 in sthn Afr., widespread across sub-Saharan Africa from Nigeria and Ethiopia to Western Cape, most diverse in Namaqualand and western Karoo (Northern Cape) in semi-arid habitats.

The flowers of *Lapeirousia* are highly variable, reflecting adaptations to a range of pollinators. These include bees, bombyliid flies, noctuid moths and butterflies for short-tubed species, long-proboscid flies of the genera *Philoliche* (Tabanidae), *Prosoeca* and *Moegistorhynchus* (Nemestrinidae) for species with long-tubed red, purple or pink to cream flowers, and sphinx and other moths for species with pale-coloured, long-tubed and fragrant flowers (Goldblatt & Manning 1995b).

Melasphaerula Ker Gawl. 1305000

(Ixioideae)

Ker Gawler: t. 615 (1803); Baker: 115 (1896).

Phalangium Burm.f.: 3 (1768) hom. illeg. not of Mill. *Diasia* DC.: 151 (1811). *Aglaea* (Pers.) Eckl.: 44 (1827).

Deciduous perennial. **Rootstock** a bell-shaped corm with a flat base, rooting from base, basal in origin, tunics woody to firm-papery and concentric. **Stem** aerial, terete and wiry, many-branched, branching divaricate. **Leaves** several, lower 2 or 3 cataphylls; foliage leaves unifacial, with a definite midrib, in a distichous fan, blades lanceolate, plane, soft-textured. **Inflorescence** a lax compound spike; bracts green, soft-textured, short, inner shorter to ± as long as outer, notched apically. **Flowers** zygomorphic and bilabiate, cream to pale yellow; lower tepals with darker median streaks, with a strong sour, musk-like scent, with nectar from septal nectaries; perianth tube obsolete. **Tepals** unequal, lanceolate-attenuate, dorsal tepal largest. **Stamens** unilateral and arcuate; filaments arising in mouth of tube; anthers exserted; pollen monosulcate, operculate, exine perforate. **Ovary** triquetrous. **Style** exserted, branches expanded above and recurved. **Capsules** coriaceous, depressed triquetrous. **Seeds** globose, 2 per locule, smooth, matte, surface colliculate. $x = 10$.

Species 1, widespread in the winter-rainfall region, extending from S Namibia to the Agulhas Peninsula (Western Cape); in sheltered shady places.

The distinctive monotypic *Melasphaerula* has an unusual combination of woody corm tunics, a short-tubed bilabiate flower, short filiform style branches and few-seeded and winged capsules. It is hard to place in Ixieae, but on the basis of its woody corm tunics and soft-textured bracts *Melasphaerula* is currently regarded as most closely related to *Geissorhiza* and *Hesperantha* (Goldblatt 1971). The small flowers have a musky slightly foetid scent and are probably pollinated by small fungus gnats (Sciaridae) and other small Diptera attracted by the sour odour.

Micranthus (Pers.) Eckl. 1313000

(Ixioideae)

Ecklon: 43 (1827); Baker: 97 (1896).

Deciduous perennials. **Rootstock** a globose corm rooting from below, axillary in origin, tunics densely fibrous. **Stem** aerial, usually simple, or few-branched, round in section. **Leaves** few, lower 2 or 3 cataphylls; foliage leaves either unifacial and with a definite midrib, blades falcate or linear, or terete, then sometimes hollow, margins occasionally thickened, lowermost arising on stem above corm, longest, remaining leaves arising above ground and smaller than basal. **Inflorescence** a spike, flowers distichous and crowded; bracts firm-textured, short, imbricate, dry and brown with broad membranous margins. **Flowers** small, zygomorphic with arcuate stamens, shades of blue, white or purple, unscented, with nectar from septal nectaries; perianth tube short, curving outward and more or less cylindric. **Tepals** subequal, dorsal arching over stamens. **Stamens** unilateral and arcuate; pollen zonasulculate, exine reticulate. **Style** filiform, branches deeply divided and recurved. **Capsules** woody, small, oblong. **Seeds** fusiform, lightly striate, matte, surface laevigate. $x = 10$.

Species ± 3, Western Cape; mostly in sandstone soils and often in damp sites, unusual in blooming in late spring or early summer.

Species are pollinated by a variety of insects including bees, wasps, butterflies, noctuid moths, and bombyliid flies.

Moraea Mill. 1265000

(Iridoideae)

Miller: 159 (1758); Goldblatt: 1 (1986a); Goldblatt & Manning: 268 (1995a).

Vieusseuxia D.Delaroche: 31 (1766). *Galaxia* Thunb.: 50 (1782); Goldblatt: 396 (1979b); Goldblatt: 1082 (1984b). *Phaianthes* Raf.: 30 (1836). *Plantia* Herb.: 89 (1844). *Hymenostigma* Hochst.: 24 (1844). *Gynandriris* Parl.: 49 (1854); Goldblatt: 247 (1980b). *Helixyra* Salisb. ex N.E.Br.: 348 (1929). *Rheome* Goldblatt: 92 (1980a). *Barnardiella* Goldblatt: 312 (1976). *Homeria* Vent.: 2 (1808); Goldblatt: 93 (1980a); 431 (1981b). *Hexaglottis* Vent.: 3 (1808); Lewis: 219 (1959a); Goldblatt: 552 (1987a). *Roggeveldia* Goldblatt: 840 (1979a). *Sessilistigma* Goldblatt: 156 (1984a).

Deciduous perennials. **Rootstock** a corm, usually replaced annually, rooting from apical bud, tunics persistent, variable in texture, mostly of coarse reticulate fibres, sometimes tunics initially more or less woody. **Stem** usually aerial, terete, simple or branched, sometimes subterranean. **Leaves** several to few, lower 1 or 2 cataphylls, these membranous, green or brown above ground or sometimes reticulate; foliage leaves usually

bifacial and channelled, without a midrib, margins sometimes inrolled, or undulate to crisped, occasionally terete, then straight, twisted or coiled, sometimes only lowermost with a blade, remaining short and entirely sheathing. **Inflorescences** rhipidia, terminal on branches, rarely apically crowded on short to vestigial branches; **spathes** usually firm to coriaceous, inner exceeding outer and both tightly sheathing, acute or attenuate, rarely truncate and outer recurving above. **Flowers** actinomorphic, mostly ± *Iris*-like, fugaceous or lasting up to 3 days, often shades of blue or yellow, also other colours, tepals clawed, usually only outer with nectar guides, sometimes sweetly or unpleasantly scented, often producing nectar from perigonal nectaries at tepal bases. **Tepals** free, united in a short tube in a few species, claws ascending to erect, usually long, sometimes short and appressed to filament column, limbs spreading to reflexed, sometimes those of inner tepals erect, rarely inner tepals reduced, then tricuspidate, filiform, hair-like or 0. **Stamens**: filaments usually united below, or entirely, rarely free, occasionally puberulent below; anthers usually appressed to style branches, sometimes concealed by claws of outer tepals, prominent when style branches narrow or reduced. **Ovary** usually pedicellate, occasionally sessile, exserted or included in spathes, extending upward as a hollow tube in some species. **Style** filiform, usually enclosed by filament column and dividing shortly beyond it, branches usually flattened and petaloid, terminating in paired petaloid crests, stigma a transverse lobe on abaxial surface at base of crests, terminal when style branches narrow or filiform, rarely style branches divided to base into paired filiform arms. **Capsules** ovoid to oblong, apex truncate or shortly beaked, coriaceous to submembranous, usually exserted, occasionally included. **Seeds** angular to fusiform, globose or compressed and discoid, variously ruminate to foveate, lineolate or more or less smooth, matte, surface usually colliculate or ocellate. $x = 10$ (9, 8, 7, 6, 5, 4) (polyploidy).

Species ± 200, throughout sub-Saharan Africa, with 2 in the Mediterranean and Middle East, concentrated in the Western Cape. ± 180 species in sthn Afr., occurring in a variety of open habitats, never in forests.

Resembling *Iris* in many ways, *Moraea* is not immediately related to this northern hemisphere genus, but is more closely related to *Dietes* and *Ferraria*. All four genera have unusual, flattened and petaloid style branches with an abaxial transverse stigma lobe and paired terminal crests. *Moraea* and *Ferraria* differ from *Iris* and *Dietes* in having a corm, and *Moraea* has a bifacial leaf. The genus is diverse and five subgenera are currently recognised. The remaining sthn Afr. genera of Iridoideae that have corms and bifacial leaves have been found to be nested within *Moraea* and are now included within that genus. A frequent floral specialisation in *Moraea* is for the inner and outer tepals to become nearly equal with the tepals of both whorls bearing nectar guides. In these species the filaments are often fused entirely and style branches and crests are reduced in size, and are sometimes filiform. Such flowers defined *Galaxia, Hexaglottis* and *Homeria*, the former in addition being acaulescent. *Barnardiella* and *Gynandriris* were defined by an ovary with a sterile tubular extension and subsessile flower. Pollination in *Moraea* is diverse. The ancestral condition appears to be pollination by long-tongued bees foraging for nectar. Several Western Cape species are pollinated by monkey beetles (Scarabaeidae), and forms of *M. lurida* have foetid-smelling flowers and are pollinated by carrion flies (Calliphoridae). Species that have prominently displayed anthers are pollinated by bees foraging for pollen.

Nivenia Vent. 1297000

(Nivenioideae)

Ventenat: 5 (1808); Weimarck: 356 (1940b); Goldblatt: 51 (1993a).

Evergreen shrubs or subshrubs, sometimes forming cushion-like tufts, with a woody underground caudex and woody aerial stems. **Stems** few to many, upright or inclined, compressed, becoming rounded below, brittle and woody (with secondary growth), marked with leaf scars, main axes simple, branched or bearing short-lived spur shoots. **Leaves** sword-shaped, crowded apically, distichous. **Inflorescence** usually compound, composed of paired (binate) rhipidial units, these 2- or 1-flowered; synflorescence either in racemose or corymbose arrangement, occasionally inflorescence a single binate rhipidium; spathes coriaceous to more or less dry, lanceolate to ovate-truncate, long or short; floral bracts usually longer than spathes, occasionally shorter, membranous to scarious, brown or silvery, smooth or wrinkled. **Flowers** actinomorphic, sessile, hypocrateriform, shades of blue, often pale in tube, some species heterostylous, plants then either with long style (pin) and short stamens, or long stamens and short styles (thrum), unscented, containing small amounts of nectar from septal nectaries; perianth tube well developed, cylindric, short to long. **Tepals** subequal, lanceolate to ovate, spreading or shallowly cupped. **Stamens**: filaments short and barely exserted from tube (pin flowers) or well exserted, in 1 species unequal, 1 shorter than others, included in tube (in thrum flowers); anthers oblong, submedianly fixed, sometimes blue; pollen monosulcate, exine reticulate. **Ovary** globose; locules usually 2-ovulate, up to 6-ovulate in 1 species. **Style** filiform, reaching to just below mouth of tube (thrum flowers) or well exserted, dividing into filiform, recurved branches or shortly 3-notched. **Capsules** fusiform, more or less woody. **Seeds** tangentially compressed and shield shaped, 1, occasionally 2, per locule, up to 6 in one species, rugose, surface colliculate, testa often partly exfoliated. $x = 16$.

Species 10, Western Cape, from near sea level to 1500 m, on rocky sandstone soils in fynbos, riverine scrub or forest margins.

The genus is closely related to the other shrubby Cape genera, *Klattia* and *Witsenia*, which have the same basic chromosome number, growth form, capsule morphology, and similar seed morphology and development. Leaf anatomical characteristics, secondary growth in the caudex and specialised endothecial thickenings are shared with the Australasian *Patersonia* (Manning & Goldblatt 1990; Goldblatt 1993a). The flowers of *Nivenia* are adapted for pollination by large-bodied, long-tongued bees, mostly Anthophoridae or long-proboscid flies (*Prosoeca*: Nemestrinidae; Goldblatt & Bernhardt 1990). Six species display morphological heterostyly.

Pillansia L.Bolus 1315010

(Ixioideae)

Bolus: 20 (1915); Obermeyer: t. 1381 (1962).

Evergreen perennial. **Rootstock** a depressed globose corm rooting from below, axillary in origin, corms of past seasons not resorbed, tunics fibrous. **Stem** erect, aerial, branched above, round in transverse section. **Leaves** few, lower 2 or 3 cataphylls; foliage leaves unifacial, without a definite midrib, linear, usually one basal per plant and one or two cauline and smaller, coriaceous and fibrotic. **Inflorescence** a panicle, each flower pedunculate, sessile; bracts coriaceous and green with reddish brown margins, mucilaginous on inside, inner ± as long as outer, notched apically. **Flowers** actinomorphic, orange, campanulate, unscented, with nectar from septal nectaries; perianth tube short, funnel-shaped. **Tepals** subequal, spreading. **Stamens** symmetrically disposed around style; filaments arising in throat; anthers exserted; pollen monosulcate, operculate, exine perforate. **Style** filiform, exserted, branches notched apically for a quarter to a third of their length. **Capsules** obovoid and truncate, woody. **Seeds** large and angular, with a chalazal crest, smooth, shiny, surface reticulate-foveate, 1–3 per locule. $x = 20$.

Species 1, restricted to the Caledon District (Western Cape): coastal to ± 700 m, in seeps or areas of poor drainage.

Although clearly a member of Ixioideae, *Pillansia* is exceptional in the subfamily in many respects. The leaves lack a definite midrib and other leaf anatomical characteristics of the subfamily, and the inflorescence is a panicle rather than a spike. However, *Pillansia* has the long-lived flower, perianth tube, basally rooting corm, operculate pollen grains and perforate exine that are derived in the subfamily. The basic chromosome number is polyploid. *Pillansia* may be an ancient relict polyploid surviving in locally equable sites in the southwestern Cape. Chloroplast DNA sequence analysis, however, shows the genus to be allied to *Thereianthus* and *Micranthus* and neither primitive nor taxonomically isolated. Little is known about its biology but its pattern of mass blooming after fire and rarely at other times, is typical of many geophytes of nutrient-poor, sandstone soils. The species appears to be pollinated by bees (Apidae, Halictidae) and monkey beetles (Scarabaeidae).

Radinosiphon N.E.Br. 1311040

(Ixioideae)

Brown: 263 (1932); Carter: t. 1384 (1962); Goldblatt: 65 (1993b).

Deciduous perennials. **Rootstock** a globose corm rooting from below, basal in origin, tunics membranous to lightly fibrous. **Stem** aerial, simple or branched, compressed and angled. **Leaves** several, lower 2 or 3 cataphylls; foliage leaves unifacial, with a definite midrib, mostly basal and forming a lax distichous fan, blades sword-shaped, plane, fairly softly textured. **Inflorescence** a spike, flowers loosely secund; bracts green, soft-textured, often becoming dry apically, inner usually shorter than outer, notched apically. **Flowers** zygomorphic, hypocrateriform, shades of pink to purple, lower tepals with darker median streaks, unscented, with nectar from septal nectaries; perianth tube cylindric, elongate. **Tepals** subequal, dorsal slightly larger and erect. **Stamens** unilateral and arcuate; filaments arising shortly below mouth of tube, exserted from tube; anthers parallel; pollen monosulcate, operculate, exine perforate. **Style** filiform, branches slender, undivided. **Capsules** globose, cartilaginous. **Seeds** globose, flattened at chalazal end, usually 2–4 per locule, rugulose, matte, surface colliculate. $x = 15$.

Species either a single polymorphic entity or possibly 2 or 3 cryptic species, frequent in mountain areas, extending from Mpumulanga and Swaziland through E Zimbabwe to S Tanzania in rocky sites in montane grassland. The long-tubed pink flowers are pollinated by the long-proboscid fly *Prosoeca ganglbaueri* (Nemestrinidae).

Romulea Maratti 1261000

(Ixioideae)

Maratti: 13, t. 1 (1774) name conserved; De Vos: 49 (1972); De Vos: 10 (1983a).

Trichonema Ker Gawl.: t. 575 (1802c). *Spatalanthus* Sweet: t. 300 (1829).

Deciduous perennials. **Rootstock** a globose, bell-shaped or asymmetric corm, often with a circular to crescent-shaped basal ridge from which roots emerge, basal in origin, tunics woody to cartilaginous or firm-papery, rarely fibrous. **Stem** short, subterranean or aerial, occasionally hairy, usually branched, sometimes below ground, often coiled in fruit. **Leaves** few to several, lower 2 or 3 cataphylls; foliage leaves 2–several, unifacial, usually with a definite midrib, all basal or some cauline, ± filiform or cylindric, straight or twisted, occasionally hairy on margins, usually midrib and margins thickened, sometimes winged, blade thus oval to terete in transverse section with 2 sinuses on each surface between margins and midrib, occasionally up to 8-grooved or nearly plane with lightly thickened margins and midrib, rarely bifacial and channelled. **Inflorescence** composed of solitary flowers terminal on peduncles; bracts green, margins of outer sometimes and of inner always membranous to scarious and pale or ferrugineous, occasionally inner bract entirely dry, rarely hairy, inner usually acute and undivided apically. **Flowers** actinomorphic, mostly campanulate, cup deep or shallow, sometimes hypocrateriform, variously coloured, often discolorous and paler in centre, sometimes with darker markings; perianth tube usually short and funnel-shaped, sometimes elongate and cylindric. **Tepals** equal or subequal, usually ascending below and spreading above. **Stamens**: filaments erect, ± contiguous, sometimes united, frequently somewhat swollen and hairy below; anthers diverging or contiguous; pollen monosulcate, operculate, exine perforate. **Style** filiform, exserted from tube, enclosed in perianth, branches short, usually divided for half their length, rarely multifid. **Capsules** oblong to subglobose. **Seeds** globose or lightly angled, flattened at chalazal end, smooth, matte, surface laevigate or areolate. $x = 14$ or 13 (12, 11, 10, 9) (aneuploid).

Species ± 88, ± 77 in sthn Afr., centred in the sthn Afr. winter-rainfall area, extending through eastern sthn Afr. to Europe and the Middle East, with a secondary centre in the western Mediterranean and Canary Islands.

The woody corm tunics with the roots arising from a basal ridge suggest a common ancestry with *Geissorhiza* and *Hesperantha*, but *Romulea* is more specialised than these genera in its partly underground stem and inflorescence of single-flowered peduncles. *Romulea* is probably close to the line that gave rise to *Syringodea* and *Crocus* in which the stem is entirely underground at anthesis, the perianth tube elongate and the leaves secondarily bifacial. The flowers close at night and in cold weather and are mostly pollinated by bees foraging for pollen. The species with brightly coloured flowers are pollinated by monkey beetles (Scarabaeidae), and the long-tubed species by long-proboscid flies (Bombyliidae and Nemestrinidae).

Sparaxis Ker Gawl. 1307000

(Ixioideae)

Ker Gawler: t. 548 (1802d); Goldblatt: 230 (1969); Goldblatt: 150 (1992); Goldblatt: 151 (1999).

Synnotia Sweet: t. 150 (1826); Lewis: 138 (1954). *Streptanthera* Sweet: t. 209 (1827). *Anactorion* Raf.: 34 (1836).

Deciduous perennials. **Rootstock** a globose corm rooting from below, basal in origin, tunics of fine soft fibres or hard coarse fibres often thickened below into vertical claws. **Stem** aerial, simple or branched at base or above ground, round in section. **Leaves** several, lower 2 or 3 cataphylls; foliage leaves in a close distichous fan, unifacial, blades sword-shaped to lanceolate, firm and somewhat fleshy, with a definite midrib and many fine, closely set secondary veins. **Inflorescence** a spike, flowers spirally arranged or secund; bracts scarious, often lacerate, pale with brown streaks, outer often tricuspidate, inner bicuspidate, smaller than outer. **Flowers** zygomorphic and bilabiate or actinomorphic and campanulate, usually cream to yellow, often with purple shading, or purple, pink, orange or yellow, sometimes sweetly or unpleasantly scented, with nectar from septal nectaries or without nectar; perianth tube short to long, funnel-shaped, lower cylindrical part short or long, upper part sometimes bent. **Tepals** subequal or unequal and dissimilar, dorsal sometimes hooded and lower united with upper laterals for some distance. **Stamens** unilateral and erect or arcuate, or symmetrically disposed; filaments arising in throat; anthers straight or sometimes sigmoid or coiled; pollen monosulcate, operculate, exine perforate. **Style** exserted, unilateral or straight and erect, branches undivided, filiform or expanded above. **Capsules** barrel-shaped to oblong, cartilaginous. **Seeds** globose, flattened at chalazal end, hard and smooth, shiny, surface laevigate, raphal vascular trace excluded. $x = 10$.

Species 15, Western Cape and Northern Cape; mainly on clay soils in renosterveld, less often in coastal sandveld.

The affinities of *Sparaxis* are uncertain: its unusual scarious bracts are like those of *Dierama* but differences in leaf anatomy and morphology, including the absence of submarginal sclerenchyma and the presence

of thickened columnar marginal epidermis, make a relationship with *Dierama* seem unlikely. *Sparaxis* may be most closely related to *Tritonia* with which the leaf anatomy, including margin structure and the presence of a midrib, coincide. Chromosome number, $2n = 20$, does not help in placing the genus: *Dierama* and *Ixia* also have $2n = 20$ and *Tritonia* 22 and 20. The short-tubed zygomorphic-flowered species are pollinated by bees and the long-tubed species by long-proboscid flies in the genus *Prosoeca* (Nemestrinidae). The actinomorphic, orange- and pink-flowered species with short tubes are pollinated by monkey beetles (Scarabaeidae) and short-tongued Tabanidae.

Syringodea Hook.f. 1260000

(Ixioideae)

Hooker: t. 6072 (1873); De Vos: 201 (1974a); De Vos: 1 (1983a).

Deciduous perennials. **Rootstock** an asymmetric, turbinate or compressed corm, with a circular to crescent-shaped basal ridge from which roots emerge, basal in origin, tunics woody to papery. **Stem** short, subterranean, often branched, sometimes sheathed below by a fibrous neck. **Leaves** few to several, lower 2 or 3 cataphylls; foliage leaves bifacial, without a definite midrib, few to 1, blade linear, sometimes lanceolate, channelled to flat, sometimes terete. **Inflorescence** composed of solitary flowers terminal on short peduncles; bracts largely membranous, green above ground with membranous margins, margins united below, inner two-keeled, the keels green above the ground, usually notched apically. **Flowers** actinomorphic, hypocrateriform, shades of purple to pink, rarely white; perianth tube cylindric, elongate. **Tepals** equal or subequal, spreading. **Stamens**: filaments arising at mouth of tube; anthers erect or ascending; pollen inaperturate, exine perforate. **Ovary** subterranean. **Style** filiform, branches short, undivided, or apices shortly lacerate. **Capsules** usually clavate to turbinate with a narrow sterile tubular base, hygrochastic and 6-valved, rarely ellipsoid, xerochastic and 3-valved. **Seeds** globose to weakly angled, flattened at chalazal end, rugulose, matte, surface laevigate. $x = 6$ (11).

Species 8, sthn Afr., mostly southern and western Karoo (Northern and Western Cape), mainly in clay soils in karroid scrub.

Easily confused with *Romulea*, *Syringodea* is distinctive in Ixioideae in its channelled, bifacial leaves and spherical, inaperturate pollen, conditions shared only with *Crocus*. In the woody corm tunics and presence of a basal ridge in some species it is similar to *Romulea*, which differs in its partly aerial stem, divided style branches, centric, four-grooved leaves, smooth seeds, aperturate pollen and basic chromosome number. Differences between *Syringodea* and *Crocus*, a genus of some 80 species, are more difficult to determine because of the variability in seed and flower characters, notably in the divided or multifid style branches. However, at least in its elaborately keeled leaves *Crocus* is distinct.

Thereianthus G.J.Lewis 1313010

(Ixioideae)

Lewis: 33 (1941).

Beilia Eckl.: 45 (1827) name only.

Deciduous perennials. **Rootstock** a globose corm rooting from below, axillary in origin, tunics densely fibrous. **Stem** aerial, usually simple, round in section. **Leaves** few, lower 2 or 3 cataphylls; foliage leaves unifacial or subterete, lowermost the longest arising on stem above corm, blades linear or falcate, either with a definite midrib, or with a few prominent veins and margins thickened or not, remaining leaves arising above ground and smaller than basal. **Inflorescence** a spike, flowers spirally arranged or more or less distichous when crowded, entire spike loosely twisted; bracts firm-textured, short, lax or imbricate, green below, apices dry and brown, or entirely dry. **Flowers** zygomorphic with arcuate stamens, shades of blue, white or purple, lower three tepals with darker markings in lower half, unscented, usually with nectar from septal nectaries, or without nectar; perianth tube short to elongate, funnel-shaped or cylindric. **Tepals** subequal, spreading or dorsal arching over stamens. **Stamens** unilateral and arcuate; pollen monosulcate, operculate, exine perforate or reticulate. **Style** filiform, branches deeply divided and recurved. **Capsules** woody, ellipsoid to fusiform. **Seeds** angular-elongate with a chalazal crest or fusiform with a long persistent funicle in one species, smooth or rugose, matte, surface areolate. $x = 10$.

Species 7, Western Cape; mostly in sandstone soils, unusual in blooming in the summer in this area of winter-rainfall.

Pollination is poorly known. The short-tubed and nectarless flowers of *T. racemosus* appear to be pollinated by monkey beetles (Scarabaeidae) while the long-tubed species may be pollinated by long-proboscid horseflies (Tabanidae).

Tritonia Ker Gawl. 1306000

(Ixioideae)

Ker Gawler: t. 581 (1802b); De Vos: 124 (1982); De Vos: 347 (1983b); De Vos: 89 (1999).

Montbretia DC.: 151 (1811). *Bellendenia* (as *Belendenia*) Raf.: 245 (1832). *Tritonixia* Klatt: 355 (1882). *Montbretiopsis* L.Bolus: 215 (1929); Goldblatt: 281 (1974).

Deciduous perennials. **Rootstock** a globose to obconic corm rooting from below, basal in origin, tunics of fine to coarse fibres. **Stem** aerial, sometimes very short and virtually subterranean, terete, simple or branched, sometimes with a fibrous neck around base. **Leaves** several, lower 2 or 3 cataphylls; foliage leaves unifacial, with a definite midrib, several, mostly basal and often forming a distichous fan, blades plane and linear to sword-shaped or terete or oval in transverse section, occasionally margins undulate to crisped, inrolled, or winged, thus H-shaped in transverse section, cauline leaves few and reduced. **Inflorescence** a spike, rarely with 1 flower per branch, flowers mostly secund, or rarely spirally arranged; bracts small to medium, green and firm, or membranous to scarious, outer usually 3-cusped, inner ± as long or slightly smaller than outer and 2-toothed or notched apically. **Flowers** zygomorphic and funnel-shaped to hypocrateriform or rarely actinomorphic and rotate, shades of orange to yellow, rarely red or pink, often venation darker than base colour, lower tepals sometimes with contrasting markings, occasionally sweetly scented, with nectar from septal nectaries; perianth tube funnel-shaped or cylindric, short or elongate. **Tepals** equal or subequal or unequal and dissimilar, then dorsal largest, lower tepals often with a tooth-like callus in lower midline. **Stamens** unilateral and arcuate or symmetrically disposed and erect or loosely spreading; filaments arising at base of throat; anthers usually exserted, sometimes included; pollen monosulcate, operculate, exine perforate. **Style** exserted or included, arcuate or central, branches slightly flattened and expanded apically and recurved. **Capsules** globose to ellipsoid, cartilaginous. **Seeds** globose, flattened at chalazal end, smooth or scalariform, surface laevigate, raphal vascular trace excluded. $x = 11$ (10) (polyploidy).

Species 28, mostly in the winter-rainfall region but extending from the Western Cape and Namaqualand to Tanzania; occurring in a variety of habitats: grassland in areas of summer rainfall; in renosterveld, karroid scrub or fynbos in areas of winter rainfall.

Although *Tritonia* is sometimes difficult to distinguish from *Ixia*, it seems likely that the two genera are not closely related. They differ notably in details of leaf anatomy, *Tritonia* lacking submarginal sclerenchyma and usually having columnar marginal epidermis. The leaf characters as well as a basic chromosome number of $x = 11$ and an orange-coloured perianth as a basal character suggest that its closest relatives are *Crocosmia* ($x = 11$) and *Chasmanthe* ($x = 10$). Flowers are mostly pollinated by long-tongued bees but the long-tubed pale-flowered species are pollinated by long-proboscid flies including *Ptiloliche* (Tabanidae) and *Moegistorhynchus* (Nemestrinidae). Species with a rotate, regular perianth are pollinated by monkey beetles (Scarabaeidae).

Tritoniopsis L.Bolus 1312010

(Ixioideae)

Bolus: 123 (1929); Lewis: 321 (1959c); Goldblatt: 577 (1990c).

Gladiolus L. subgenus *Schweiggera* E.Mey. ex Baker: 178 (1878). *Tanaosolen* N.E.Br.: 262 (1932). *Anapalina* N.E.Br.: 274 (1932); Lewis: 53 (1960). *Exohebea* R.C.Foster: 36 (1939).

Evergreen or deciduous perennials. **Rootstock** a depressed-globose corm rooting from below, axillary in origin, tunics of matted, coarse to fairly fine fibres often accumulating in a dense mass. **Stem** aerial, simple or branched, leafy below or with dry scales, round in section. **Leaves** several, unifacial, basal longest, cauline decreasing in size above, sometimes filiform, blades plane, sometimes pseudopetiolate and abruptly expanded above base, with more than one main vein unless very narrow, often partly or entirely dry at flowering. **Inflorescence** a spike, flowers spirally arranged; bracts coriaceous or dry and brown at flowering time, inner as long or usually longer than outer, entire. **Flowers** zygomorphic and bilabiate or tubular and hypocrateriform, rarely actinomorphic, usually shades of pink to purple or red, sometimes white, yellow, brown or cream, lower tepals usually with darker or lighter markings, sometimes scented, with nectar from septal nectaries; perianth tube short to long, cylindric, funnel-shaped or narrow below and broadly tubular above. **Tepals** subequal, or unequal and then bilabiate, sometimes dissimilar, dorsal much larger than lower, sometimes markedly clawed. **Stamens** unilateral and arcuate or horizontal, rarely symmetrically disposed and erect; filaments arising in mouth of tube or at base of wider part, curving outward after anther dehiscence; anthers blunt or short- to long-apiculate; pollen monosulcate, operculate, exine perforate. **Style** filiform, branches short and recurved, sometimes emarginate or shortly bilobed. **Capsules** ovoid to globose, coriaceous, often somewhat to much inflated. **Seeds** angled, with a chalazal crest, sometimes winged on angles and coat somewhat spongy, matte, irregularly sculpted, alveolate. $x = 16$ (15) (polyploidy).

Species 22, mainly Western Cape, extending from the Bokkeveld Escarpment to the Transkei (Eastern Cape), most often in sandstone soils in fynbos.

Tritoniopsis is taxonomically isolated within Ixioideae and is readily distinguished by the short, firm-textured floral bracts, the inner floral bract longer than the outer, and the leaves with more than one main vein, thus lacking a definite midrib. The flowers are adapted for pollination by a variety of animals. The short-tubed species are mostly pollinated by bees, and the long-tubed species either by moths or long-proboscid flies. The red-flowered *T. lesliei*, which has red, hypocrateriform, rotate flowers is probably pollinated by the butterfly *Aeropetes*. Other red-flowered species with zygomorphic flowers may also be pollinated by *Aeropetes* or by sunbirds or both. The light spongy seeds with winged angles are wind-dispersed.

Watsonia Mill. 1315000

(Ixioideae)

Miller: 184 (1758); Goldblatt: 25 (1989).

Meriana Trew: 11 (1754), name rejected contra *Watsonia*. *Lomenia* Pourr.: 74 (1788). *Neuberia* Eckl.: 37 (1827) name only.

Deciduous or sometimes evergreen perennials. **Rootstock** a globose or depressed-globose corm rooting from below, axillary in origin, those of past seasons often not resorbed, tunics coriaceous, with age becoming fibrous. **Stem** aerial, usually branched, round in section. **Leaves** several, lower 2 or 3 cataphylls; foliage leaves unifacial, with a definite midrib, coriaceous and fibrotic, mostly basal, plane, margins and midribs often thickened and prominent, cauline leaves smaller than basal and progressively reduced above. **Inflorescence** a simple or branched spike, flowers distichously arranged; bracts firm-textured, green or partly to completely dry at anthesis, inner smaller, as long or longer than outer, usually forked apically. **Flowers** zygomorphic, actinomorphic in one species, shades of pink, orange or red, rarely cream to pale yellow, sometimes with contrasting markings on lower tepals, unscented, with nectar from septal nectaries; perianth tube slightly to strongly curved, lower part cylindric, upper part flared or broad and cylindric. **Tepals** subequal. **Stamens** symmetrically disposed or unilateral and then arcuate or declinate; filaments arising in throat; anthers exserted; pollen monosulcate, operculate, exine perforate. **Style** filiform, exserted, branches forked for half their length and recurved. **Capsules** globose to oblong or elongate, sometimes fusiform, coriaceous to woody. **Seeds** large, angular or compressed and winged at chalazal end or at both ends, sometimes ribbed, matte, surface areolate. $x = 9$.

Species 52, sthn Afr., concentrated in the Western Cape, but extending into Namaqualand (Northern Cape) in the north and well represented in the summer-rainfall parts of sthn Afr., especially S KwaZulu-Natal and the Drakensberg escarpment in Swaziland and Mpumalanga.

The genus is well defined and monophyletic, and is distinguished by pink or red perianth colour, strongly distichous inflorescence, divided style branches, dimorphic perianth tube and basic chromosome number of $x = 9$. It appears to be most closely allied to *Thereianthus* and *Micranthus*. *Watsonia* exhibits a wide range of floral forms, which are correlated with their pollination biology. Species with a pink or yellow perianth and a short funnel-shaped tube produce small quantities of nectar and are pollinated by bees whereas those with a red perianth and long, dimorphic cylindrical tube produce ample nectar and are pollinated by sunbirds. The latter type of flower is specialised and appears to have arisen at least 3 times in the genus. A few species have pink flowers with a long perianth tube and are mostly pollinated by long-proboscid flies.

Witsenia Thunb. 1296000

(Nivenioideae)

Thunberg: 33 (1782), as *Witsena*; Goldblatt: 117 (1993a).

Evergreen shrub with a woody caudex and woody aerial stems. **Stems** upright or inclined, compressed, becoming rounded below, brittle and woody (with secondary growth), marked with leaf scars, main axes simple, sparsely branched. **Leaves** sword-shaped, crowded apically, distichous. **Inflorescence** compound, terminal, pseudopaniculate, lateral branches short, terminating in binate rhipidia, these shortly stalked and subtended by a bract, enclosed below by coriaceous bracts; binate rhipidia each 2-flowered, spathes large, pale green, coriaceous; floral bracts membranous, shorter than spathes. **Flowers** actinomorphic, sessile, tubular, tube shades of green, tepals closed throughout anthesis, green and yellow, unscented, with nectar produced from septal nectaries; perianth tube elongate, widely cylindric. **Tepals** obscurely clawed, reverse of limbs velvety-pubescent. **Stamens**: filaments slightly flattened, reaching to ± middle of tepal limbs; anthers oblong, subbasifixed, connective pouched below around filament apex, included, introrse; pollen monosulcate, exine reticulate, with supratectal gemmae. **Ovary** globose, domed above insertion of tepals, enclosing enlarged septal nectaries, locules 2-ovulate. **Style** filiform, shortly exserted from flower, shortly 3-notched apically. **Capsules** fusiform, more or less woody. **Seeds** tangentially compressed and shield-shaped, 1 per locule, smooth, surface granulate, testa often partially exfoliated. $x = 16$.

Species 1, Western Cape from the Cape Peninsula to Swellendam, sea level to 600 m, in marshes in peaty sandstone soil.

The long-tubed flowers produce large quantities of nectar and appear to be adapted for bird pollination. Observations are needed to confirm preliminary reports of pollination by the malachite sunbird, *Nectarinia famosa*.

Xenoscapa (Goldblatt) Goldblatt & J.C.Manning
(Ixioideae) 1316020

Goldblatt & Manning: 172 (1995b).

Anomatheca Ker Gawl. section *Xenoscapa* Goldblatt: 88 (1972).

Seasonal perennials. **Rootstock** a small globose corm rooting from below, basal in origin, tunics of fine fibres. **Stem** short or long, erect, terete, often with 1–3 short branches. **Leaves** few, lower 2 or 3 cataphylls; foliage leaves 2 or 3, unifacial, with a definite midrib, prostrate, soft-textured. **Inflorescence** of solitary flowers terminal on axes; bracts green, coriaceous, inner often slightly longer, or slightly shorter than outer, often notched apically. **Flowers** zygomorphic, tubular or hypocrateriform, whitish or pink, sometimes with contrasting markings on lower tepals, sometimes sweetly scented, with nectar from septal nectaries; perianth tube cylindric and elongate. **Tepals** subequal, spreading or dorsal ones erect, slightly larger, and cucullate. **Stamens** unilateral and arcuate, arising shortly below mouth of tube; anthers exserted; pollen monosulcate, operculate, exine perforate. **Style** filiform, exserted, branches short, deeply divided and recurved. **Capsules** oblong to cylindric, cartilaginous. **Seeds** strongly angled, with a chalazal crest, rugulose, matte, surface areolate. $x = 11$.

Species 2, 1 widespread in the winter-rainfall region and one highly localised in Namaqualand (Northern Cape), either on granite or clay soils.

The relationships of the genus are uncertain. *Xenoscapa uliginosa* is pollinated by the long-proboscid fly, *Prosoeca peringueyi* (Nemestrinidae), and *X. fistulosa*, which has fragrant flowers, probably by moths.

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Juncaceae

(Commelinidae—Juncales)

Compiled by R.P. Glen

Annual or perennial, tufted, rhizomatous, marsh or aquatic herbs. **Leaves** alternate, grass- or rush-like, filiform, linear to narrowly lanceolate, sheathing at base or reduced to sheaths. **Flowers** usually bisexual, regular, marcescent, small, in terminal panicles, corymbs or heads, rarely solitary. **Perianth** 3 + 3; segments subsimilar, rarely inner whorl absent, glumaceous, mostly green or brown to blackish. **Stamens** (3)3 + 3, hypogynous; filaments trigonous or filiform; anthers 2-thecous, basifixed, introrse, opening lengthways; pollen in tetrads. **Ovary** superior, 1- or 3-locular; ovules 3–many, basal, axile or parietal, biseriate, bitegmic; style present or 0; stigmas 3. **Capsule** 1–3-locular, dehiscing loculicidally. **Seeds** 3–many, small, ovoid, obovoid, globose, spindle-shaped or compressed, often with basal and/or apical appendages; embryo straight; endosperm starchy.

Genera 7, species ± 314, cosmopolitan, in moist, temperate or cold regions. *Juncus* and *Luzula* are the largest genera occurring worldwide, with the highest species diversity in the northern hemisphere; the remaining five smaller genera are restricted to the southern hemisphere, especially South America; sthn Afr.: genera 2, species ± 27.

Brown: 16 (1897); Friedrich-Holzhammer: 156 (1967); Obermeyer: 71 (1985); Cook: 108 (1990).

Key to genera

Leaves glabrous, usually with an open leaf sheath; ovary 3-locular through protruding parietal placentas; seeds many, small, occasionally tailed ..... **Juncus**

Leaves with inconspicuous, scattered, silky hairs; leaf sheath closed; ovary unilocular, with 3 basal ovules; seeds few, subglobose, minutely striate, often with appendages ..... **Luzula**

Juncus L. 0936000

Linnaeus: 325 (1753); Brown: 16 (1897); Adamson: 3 (1935); Friedrich-Holzhammer: 1 (1967); Obermeyer: 73 (1985); Cook: 108 (1990).

Annual or perennial rhizomatous herbs. **Leaves** of two main types, either rosulate, tufted, grass-like soft; or 1–few per shoot on linear, horizontal rhizomes, hard, terete, rush-like, often septate or reduced to usually open basal sheaths. **Scape** terete or trigonous, often naked; bracts and bracteoles present, glumaceous. **Flowers** usually very many in much-branched, exserted panicles (anthelae), or contracted and congested, rarely reduced to a few flowers. **Perianth** segments ovate or lanceolate, hard, brown or green, glumaceous. **Stamens**: filaments filiform or trigonous. **Ovary** with parietal placentas protruding to form 3 ± separate locules; ovules biseriate, many; style terete, long or short, with 3 stigmatic arms. **Capsule** 3-valved, loculicidal. **Seeds** many, small, occasionally tailed. $x = 10$ (aneuploids, high polyploidy).

Species ± 250, cosmopolitan; ± 26 in sthn Afr., widespread, mainly in mild to cold situations; in shallow water on the banks of streams, dams or lakes, in vleis, marshes or seepage areas.

Luzula DC. 0937000

Candolle: 158 (1805) name conserved; Brown: 27 (1897); Carter: 7 (1966); Friedrich-Holzhammer: 3 (1967); Obermeyer: 91 (1985).

Tufted, grass-like annual, or usually perennial herbs. **Leaves** flat, linear, with closed basal sheaths, inconspicuously silky-hairy. **Inflorescence** of dense, terminal spikes, heads or panicles, subtended by 1–few leaf-like bracts. **Scapes** long, furnished with reduced leaves or bracts, the upper subtending the inflorescence. **Flowers** each subtended by a small membranous ciliate bract. **Perianth** segments glumaceous. **Ovary** unilocular, with 3, nearly basal ovules. **Capsule** loculicidal. **Seeds** few, ovoid to globose, with or without an apical or basal appendage. $x = 6$ (3) (polyploidy).

Species ± 80, mostly north temperate regions, rare in southern hemisphere; 1 in sthn Afr.: *Luzula africana* Drège ex Steud., Namibia, KwaZulu-Natal, Lesotho and Eastern Cape, at fairly high altitudes.

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Juncaginaceae

(Alismatidae—Alismatales)

Compiled by R.P. Glen

Perennial, herbaceous, scapose, glabrous marsh plants. **Rhizome** stoloniferous or bulbous, covered with fibres from old leaves. **Roots** fibrous, with spongy outer covering that soon disintegrates, leaving the thin wiry stele; lateral roots thin, with long root hairs. **Leaves** basal, distichous, rush-like, cylindrical to setaceous, glaucous, somewhat succulent, forming a broad open sheath below; ligule present at junction of sheath and lamina; axillary scales minute, linguiform. **Inflorescence** a simple raceme overtopping leaves; scape terete, firm. **Flowers** regular or somewhat irregular, bisexual or unisexual, protogynous, anemophilous, ebracteate, on decurrent, erecto-patent pedicels. **Perianth** 3 + 3; green, inner segments raised above outer whorl, shell-shaped with a stamen contained in the hollow, segment and stamen semipersistent, falling together. **Stamens** 3 + 3; anthers sessile, epipetalous, 2-thecous, dorsifixed, dehiscing

longitudinally; pollen globose. **Ovary** superior; carpels 6 or outer whorl suppressed, ± connate, each containing 1 basal anatropous ovule; styles short or 0; stigmas plumose. **Fruit** ± globose to cylindrical, sometimes spurred below, of usually 3 follicles separating upwards from a central columella. **Seeds** erect; embryo straight; endosperm 0. $x = 12$ (7, 8, 9, 10) (high polyploidy).

Genera 4, species 20, cosmopolitan; sthn Afr.: genus 1, species 2.

Bennett: 41 (1897), Najadaceae in part; Obermeyer: 92 (1966); Dahlgren *et al.*: 310 (1985); Cook: 108 (1990).

Triglochin L. 0066000

Linnaeus: 338 (1753), Bennett: 41 (1897); Obermeyer: 92 (1966); Cook: 109 (1990).

Description as for family.

Species ± 15, cosmopolitan; 2 in sthn Afr., KwaZulu-Natal, Northern, Western and Eastern Cape, in marshy areas along the coast or in shallow water around the edges of inland waters.

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Lanariaceae

(Liliidae—Liliales)

Compiled by R.H. Archer

Erect, tough, tufted perennials; rhizome relatively short, vertical, whitish in transection, lower part of rhizome dark, verrucose, with one thick root emerging from each wart-like lobe; upper part bearing several leaves and, below them, dense, fibrous, brownish black sheaths of old leaves. **Leaves** basal, distichous, about 6 per shoot, linear, rigid, ribbed, glabrous, sheathing at base. **Flowers** bisexual, regular, many, in a much-branched, bracteate cyme or expanded panicle, densely villous with white plumose hairs; peduncle exserted, villous, with some scattered, glabrous, acuminate bracts; pedicels short. **Perianth** with short tube and 6 spreading, linear segments, villous outside, glabrous and a mauvy-pink inside. **Stamens** 3 + 3, erect, short outer filaments arising from throat of perianth, 3 inner somewhat shorter; anthers versatile, sagittate, opening by longitudinal slits. **Ovary** subinferior, protruding somewhat above, 3-locular; ovules axile, anatropous, 2 in each locule; style subulate, exserted; stigma small, 3-lobed. **Capsule** subglobose, 1-seeded, crowned with persistent perianth; fertile locule dehiscing loculicidally. **Seeds** single, black, shiny, with thick testa encrusted with phytomelan; endosperm copious, nonstarchy.

Monotypic: *Lanaria* Aiton endemic to sthn Afr.

Dahlgren & Van Wyk: 71 (1988).

Formerly usually placed in Haemodoraceae.

Lanaria Aiton 1236000

Aiton: 462 (1789); Baker: 4 (1896); De Vos: 79 (1963); Hutchinson: 831 (1973); Dahlgren & Van Wyk: 71 (1988).

Description as for family.

Species 1: *Lanaria lanata* (L.) T.Durand & Schinz, sthn Afr., from the Hottentots Holland Mountains in Western Cape to near Port Elizabeth, Eastern Cape.

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Lemnaceae

(Arecidae—Arales)

Compiled by R.P. Glen

Small to minute, glabrous, floating, freshwater herbs, forming a discoid, oblong, strap-shaped or globular body (frond), with or without roots, viviparous, gregarious, usually monoecious; annual fronds changing to turions under unfavourable conditions. **Roots**, if present, with or without a basal sheath, with a large calyptra. **Fronds** solitary or a few cohering temporarily, variously shaped, with 1 or 2 budding pouches (reproductive cavities) at or near the proximal end, usually marginal, in which viviparous daughter fronds develop continually. **Inflorescence** spathaceous, in subfamily Lemnoideae 1 or 2 marginal cavities may occasionally produce an emergent inflorescence enclosed in a spathe which ruptures at anthesis; in subfamily Wolffioideae emergent inflorescences are formed in 1 or 2 special dorsal cavities (apart from budding marginal budding pouches), and lack a spathe. **Flowers** unisexual, rarely produced, without perianth. **Male flowers** reduced to 1 stamen; anther 1- or 2-thecous. **Female flower** flask-shaped; ovary 1-locular, with 1–4 basal ovules; style short; stigma apical. **Fruit** a 1–4-seeded utricle. **Seeds** ribbed or smooth; embryo straight; endosperm fleshy or 0.

Genera 4, species 29; widespread in still, fresh water, many are cosmopolitan; sthn Afr.: genera 4, species 10.

Brown: 39 (1897); Friedrich-Holzhammer: 1 (1967); Den Hartog & Van der Plas: 355 (1970); Cook: 113 (1990).

Family derived from Araceae (neotenous) and placed there by A.P.G. (1998).

Key to genera

1a Roots present (subfamily LEMNOIDEAE):
  2a Plants with several, usually short roots ..... **Spirodela**
  2b Plants with one, usually long root ..... **Lemna**
1b Roots absent (subfamily WOLFFIOIDEAE):
  3a Plants globular ..... **Wolffia**
  3b Plants flat ..... **Wolffiella**

Lemna L. 0795000

Linnaeus: 970 (1753); Den Hartog & Van der Plas: 360 (1970); Landolt: 471 (1986); Cook: 113 (1990).

Small, usually discoid aquatics, floating or slightly submerged and rising to surface at anthesis. **Roots** solitary, rarely 0, fairly long, bearing a basal sheath and calyptra. **Fronds** solitary or several cohering for shorter or longer periods, regular or somewhat irregular, in various rounded shapes to linear-lanceolate, flat or gibbous dorsally with a median row of papillae and 1–5(–7) nerves, without pigment cells in the epidermis; margin entire or rarely denticulate; dorsal and ventral scale wanting. **Budding pouch** marginal, rarely ventral or dorsal. **Inflorescence** of 1 female and 2 male flowers enclosed in a membranous sheath. **Anther** 2-thecous. **Utricle** with 1–7 ovules. **Seeds** longitudinally ribbed with transverse striations, rarely smooth. $x = 10$ (high polyploidy).

Species 13, almost cosmopolitan, 3 in sthn Afr., common in most water bodies, usually gregarious, can become a problem plant in water high in organic matter. Seeds, turions or complete fronds dispersed by water and also by adhesion to animals, mostly birds.

Spirodela Schleid. 0794000

Schleiden : 391 (1839); Den Hartog & Van der Plas: 358 (1970); Cook: 113 (1990).

Small, floating, discoid aquatics. **Roots** (1)3–18, fairly short, clustered and with a short basal sheath; dorsal and ventral scales present, the latter perforated or adnate to some roots. **Fronds** solitary or a few cohering temporarily, reniform to rounded or obovate, flat or inflated, often reddish below, nerves 3–15. **Budding pouches** 2, opening just below margin at proximal end, one or the other occasionally producing flowers. **Inflorescence** of 1 female and 2 male flowers enclosed in a membranous sheath. **Anther** 2-thecous. **Utricle** with 1–5 ovules. **Seeds** ovoid, longitudinally ribbed, with transverse striations or smooth with spongy outer layer. $x = 10$ (high polyploidy).

Species 3, ± cosmopolitan; 2 in sthn Afr., widespread.

Wolffia Horkel ex Schleid. 0796000

Schleiden: 233 (1844); Brown: 40 (1897); Den Hartog: 591 (1969); Landolt: 544 (1986); Cook: 113 (1990).

Minute, floating, rootless aquatics. **Fronds** rarely exceeding 1 mm in any dimension, solitary or 2 remaining attached, inflated, globose to ovoid, with 1 basal, lateral, funnel-shaped budding pouch; daughter plants soon separating, nerves absent. **Roots** 0. **Flowering cavity** in upper surface of frond. **Inflorescence** of 1 female and 1 male flower, without a membraneous sheath. **Anther** 1-thecous. **Utricle** with 1 ovule. **Seed** globose, up to 0.5 mm long, smooth with spongy outer layer. $x = 10$ (high polyploidy).

Species 9, ± cosmopolitan, absent from colder areas; 2 in sthn Afr., widespread.

Wolffiella (Hegelm.) Hegelm. 0796010

Hegelmaier: 303 (1895); Brown: 41 (1897); Cook: 113 (1990).

Wolffiopsis Den Hartog & Van der Plas: 366 (1970). *Pseudowolffia* Den Hartog & Van der Plas: 365 (1970).

Small, semisubmerged, rootless aquatics; flowering part emergent during anthesis. **Fronds** thin, linear to oblong, obtuse, acute or denticulate; flowering frond of *W. denticulata* differing from vegetative form in being short and globose. **Budding pouch** at proximal end, triangular, flat, with a transverse slit (in *W. denticulata* daughter plants cohering for some time, also reproducing, eventually forming a star-shaped colony if undisturbed). **Flower cavity** on dorsal surface. **Inflorescences** 1 or 2 on each frond, each of 1 male flower and 1 female flower, without a membranous sheath. **Anther** 1-thecous. **Ovary** 1-ovulate, protogynous. **Utricle** 1-seeded. **Seeds** globose or ovoid, up to 0.45 mm long, smooth with a spongy outer layer. $x = 10$ (polyploidy).

Species 9, tropical and subtropical America and Africa; 3 in sthn Afr., *Wolffiella denticulata* (Hegelm.) Hegelm. endemic to KwaZulu-Natal.

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*Liliaceae

(Liliidae—Liliales)

Compiled by N.L. Meyer

Erect herbs with scaly bulbs; roots thick. **Stems** erect, annual, usually unbranched, not enclosed by membranous outer tunic. **Leaves** 20–40(–60), alternate, distributed along stem, sessile, flat, dorsiventral, lanceolate or oblong-lanceolate, attenuate, bifacial, parallel-veined, up to 7 veins more conspicuous. **Flowers** bisexual, regular, often solitary, but up to at least 7, in a raceme, horizontal, (120–)150–200 mm long, infundibuliform, hypogynous. **Pedicels** erect to cernuous, not articulated. **Tepals** 3 + 3, similar, forming a tube, reflexed distally, not clawed, white; glabrous, nectariferous furrow towards base. **Stamens** 3 + 3; filaments glabrous, free, filiform above, linear below, 90–140 mm long; anthers epipeltate, 2-locular, dorsifixed, opening longitudinally, introrse; pollen yellow. **Ovary** superior, 3-locular, sessile, oblong to obovoid; ovules (1–)many, axile, usually biseriate occasionally multiseriate; style terete, sometimes clavate, 80–120 mm long; stigma deeply 3-lobed. **Fruit** a loculicidal capsule, coriaceous, perianth deciduous. **Seeds** many, flat, disc-shaped, papery. $x = 12$ (polyploidy).

Genera 13, species ± 400, widespread but mostly northern temperate; sthn Afr.: 1 naturalised species.

Jussieu: 48 (1789); Dahlgren *et al.*: 233 (1985) in strict sense.

Liliaceae in broad sense include the following families: Agapanthaceae, Alliaceae, Anthericaceae, Asparagaceae, Asphodelaceae (including Aloaceae), Colchicaceae, Eriospermaceae, Hyacinthaceae, Luzuriagaceae and Smilacaceae. There is continuing discussion on the family delimitations.

*Lilium L. 1072000

Linnaeus: 302 (1753); Baker: 225 (1875); Elwes: 1 (1880); Krause: 329 (1930); Drysdale Woodcock & Stearn: 23 (1950); Sealy: 273 (1950); Jessop: 214 (1979).

Description as for family.

Species ± 100, 1 in sthn Afr.: **Lilium longiflorum* Thunb. cultivar *formosanum*, an occasional garden escape in Mpumalanga and KwaZulu-Natal; commercially important ornamental with beautiful flowers.

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Limnocharitaceae

(Alismatidae—Alismatales)

Compiled by R.P. Glen

Annual or perennial, decumbent or erect, either rooted or free-floating herbs; roots concentrated on a long or short rhizome. **Leaves** basal, ± distichous, erect, juvenile linear; adult differentiated into petiole and blade; lamina lanceolate to ovate or cordate, cuneate at base, acute or obtuse at apex, tipped by a hard blunt mucro; with parallel nerves. **Inflorescence** umbellate, 1 whorl of flowers, sometimes 2 in larger plants; peduncle longer than leaves; each whorl with rather few bracteate, long-pedicellate flowers, or flowers solitary. **Flowers** regular, bisexual, hypogynous. **Sepals** 3, green, persistent, with latex tubes. **Petals** 3, larger than sepals, delicate, not persistent, white to rose or yellow. **Stamens** ± 9, all fertile. **Carpels** superior, 4–9, united at base, in 1 or rarely 2 whorls; ovules many, parietal. **Fruit** a head of follicles or thin-walled nutlets; longer than sepals. **Seeds** many, scattered over inner surface of carpel wall, smooth and shiny, black to brown; embryo horseshoe-shaped.

Genera 3, species 11; sthn Afr.: genus 1, species 1; **Hydrocleys nymphoides* (Willd.) Buchenau, 'Water Poppy', is cultivated as an ornamental aquatic plant.

Hooper & Symoens: 56 (1982); Dahlgren *et al.*: 299 (1985); Cook: 116 (1990).

According to Dahlgren *et al.* (1985) the Limnocharitaceae are very similar to the Alismataceae and it was with some hesitation that they separated the two families.

Butomopsis Kunth 0082010

Kunth: 164 (1841); Hooper & Symoens: 56 (1982); Cook: 116 (1990).

Tenagocharis Hochst.: 369 (1841); Carter: 1 (1960).

Description as for family.

Monotypic: *Butomopsis latifolia* (D.Don) Kunth, tropical Old World; sthn Afr., Okavango region (Botswana).

References

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Luzuriagaceae

(Liliidae—Asparagales)

Compiled by N.L. Meyer

Slender forest climbers with much-branched woody stems from rhizomes with swollen roots. **Leaves** alternate, sessile, parallel-veined with slight reticulate venation; stipules and similar structures 0. **Flowers** regular, bisexual, small, in few-flowered, lax, axillary cymes. **Tepals** 3 + 3, forming a short broad tube with lobes equal, spreading. **Stamens** 3 + 3, arising from lower half of perianth tube, extending to mouth; filaments free, terete; anthers introrse, versatile. **Ovary** superior, 3-locular, attenuate at base; ovules axile, few; style trigonous; stigma apical, obtuse, tripartite. **Fruit** a berry with a short basal stipe, white. **Seeds** 3–15.

Genera 4 or 5 with 7 or 9 species, S South America, Australia, Indonesia and New Zealand; sthn Afr.: genus 1, species 1.

Dahlgren *et al.*: 135 (1985); Obermeyer: 83 (1992).

Behnia Didr. 1147000

Didrichsen: 182 (1855); Baker: 561 (1875); Baker: 274 (1896); Hutchinson: 772 (1973); Obermeyer: 83 (1992).

Dictyopsis Harv.: t. 5638 (1867); Harvey: 406 (1868).

Description as for family.

Monotypic: *Behnia reticulata* (Thunb.) Didr., sthn Afr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, SE Western and Eastern Cape.

References

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Musaceae

(Zingiberidae—Zingiberales)

Compiled by C. Archer

Large, thick-stemmed, glabrous herbs with erect, unbranched stem (pseudostem) broadening towards rarely suckering base, stem formed by imbricated bases of petioles, dying after flowering. **Leaves** spirally arranged, simple, large, with thick midrib and numerous pinnately-parallel nerves extending to margin; petiole expanded, sheathing. **Flowers** mostly unisexual, irregular, aggregated into fans in axils of bracts, forming pendulous bunches; female or bisexual flowers within lower deciduous bracts and male flowers subtended by ± persistent upper bracts. **Perianth** segments 6 in 2 whorls, but outer 3 and inner 2 reduced to teeth or lobes of a tube split along 1 side, with the third inner one free. **Stamens** 5 or 6, perfect, the sixth sometimes rudimentary; filaments filiform; anthers linear, 2-thecous, thecae parallel and contiguous. **Ovary** inferior, 3-locular, each locule with many ovules on an axile placenta; style short; stigma 3–5-lobed. **Fruit** fleshy, indehiscent, inedible, 3-locular. **Seeds** subglobose with a thick hard black testa, with conspicuous hilum. $x = 9$ (polyploidy).

Genera 2, species ± 45, tropics of Old World; sthn Afr.: genus 1, species 1; however, species of **Musa* L. (1318000), the edible bananas, which constitute an important industry in subtropical, frost-free areas of Mpumalanga and KwaZulu-Natal, very occasionally appear as escapes.

Cheesman: 97 (1947); Hutchinson: 719 (1973).

Ensete Horan. 1318010

Horaninov: 8, 40, t. 4 (1862); Baker & Simmonds: 407 (1953); Moore: 167 (1957).

Description as for family.

Species ± 25, subtropics of Africa to Asia and New Guinea; 1 in sthn Afr.: *Ensete ventricosum* (Welw.) Cheesman (= *Musa davyae* Stapf): forest glades of NE Mpumalanga.

References

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Najadaceae

(Alismatidae—Najadales)

Compiled by R.P. Glen

Submerged herbaceous annuals or perennials, monoecious or dioecious, in fresh or brackish water. **Roots** simple, adventitious, devoid of root caps. **Branches** upright, repeatedly forked, brittle, smooth or prickly. **Leaves** sessile, in pseudo-whorls of 3 or more, with an open, folded basal sheath and a linear, 1-veined, dentate lamina, with 2 axillary scales. **Flowers** unisexual, small, solitary or sometimes aggregated above, water-pollinated. **Male flower** a single stamen enveloped in bud by a closed spathe, with a thin inner membrane, bilobed at apex, closely adhering to the 1- or 2- or 4-thecous anther; pollen globose or ellipsoid, without exine, contents granular. **Female flower** a single ovoid carpel surrounded by a spathe, or naked; ovule solitary, basal, erect, anatropous; style filiform, with 2(3) filiform stigmatic branches. **Fruit** a small, narrowly ovoid nut; epicarp reticulated. **Seeds**: embryo straight, with a large hypocotyl and radicle; endosperm 0. $x = 6$ (7, 8, 17, 23) (high polyploidy, B-chromosomes).

Monogeneric, species ± 40, cosmopolitan except in very cold regions; sthn Afr.: species 4.

Bennett: 41 (1897); Obermeyer: 81 (1966); Cook: 128 (1990).

Najas L. 0064000

Linnaeus: 1015 (1753); Bennett: 51 (1897); Obermeyer: 82 (1966); Triest: 19, 28, 44, 69 (1987).

Description as for family.

Species ± 40, 4 in sthn Afr., 2 widespread, in fresh or brackish water in inland or coastal lakes; *Najas graminea* Delile has been collected twice, once in Gauteng and once in Mpumalanga; it is common in the rest of Africa. *Najas setacea* Rendle has been collected in Ndumu Game Reserve, KwaZulu-Natal; this is a new record for the continent of Africa.

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Orchidaceae

(Liliidae—Orchidales)

Compiled by H. Kurzweil

Perennial herbs, terrestrial, lithophytic or epiphytic; green or rarely saprophytic; with underground root tubers, corms, rhizomes, or above-ground pseudobulbs. **Leaves** cauline or basal; alternate, often distichous, rarely opposite; mostly simple and variously lanceolate to ovate; occasionally all reduced to scales, often fleshy, sheathing at base. **Inflorescences** racemes or panicles, rarely 1-flowered; flowers bisexual, occasionally unisexual, usually irregular. **Sepals** (outer perianth lobes) 3, mostly coloured and petaloid, median one often galeate and frequently spurred. **Petals** (lateral inner perianth lobes) 2, frequently rather simple and similar to sepals; sometimes different and with colour markings and various callosities. **Lip** (median inner perianth lobe) often lobed and spurred, occasionally galeate; usually facing down (resupinate position), rarely facing up (nonresupinate). **Stamen** 1 in all African genera, united with style to form a gynostemium (column); with 2 erect, forward-bent (incumbent) or reflexed thecae which may be adjacent or separated by wide connective; thecae frequently covered by distinct cap (operculate); pollen usually cohering in 2, 4 or 8 pollinia; pollinia mealy-soft, sectile (consisting of individual pollen massulae) or hard and often waxy; naked or with pollinium stalks (2 types: caudicle = stalk produced within the anther, often yellow and translucent, elastic and sticky; stipe = nonsticky rostellum tissue); attached to 1 or 2 viscidia (sticky glands) of rostellum. **Stigma** entire, 2-lobed or consisting of two separate areas; pad- or cushion-like, situated in cavity or sometimes on stalks in front of gynostemium; borne in upper or lower part of gynostemium, usually facing forwards or upwards, rarely downwards or sideways; upper part of median stigma lobe normally transformed into nonreceptive rostellum which bears viscidia. **Ovary** inferior, 1-locular in all African genera, with many ovules on 3 parietal placentae. **Fruit** a capsule; opening with 6 valves. **Seeds** many, minute and fusiform, 0.2–2 mm long.

Genera ± 800, species ± 20 000; cosmopolitan, but infrequent in dry areas or at high altitudes; sthn Afr.: genera 52, species ± 466.

Rolfe: 3 (1912, 1913); Schelpe: 279 (1962); Schelpe: 1 (1966); Sölch: 1 (1967); Harrison: 1 (1972); Stewart *et al.*: 1 (1982); Linder & Kurzweil: 1 (1999).

A natural concept is here used as a basis of the key to subfamilies and tribes which has been largely adopted from Dressler (1993) and Linder & Kurzweil (1994). Keys to the genera are artificial and follow Stewart *et al.* (1982). An entirely artificial key to all sthn Afr. genera is also provided (p. 647).

Key to subfamilies and tribes

1a Plants terrestrial without pseudobulbs or corms, frequently with root tubers; very rarely growing on trees or rocks but then always having fleshy root tubers; leaves thin and soft, deciduous; anther erect, horizontally reflexed or pendent, not incumbent and not operculate; pollinia almost always sectile:

2a Anther erect and subequal to rostellum; plants terrestrial or occasionally epiphytic, without root tubers..... Subfamily SPIRANTHOIDEAE:

3a Leaves convolute, soft-herbaceous, often arranged ± rosette-like; inflorescence terminal..... Tribe **Cranichideae**

3b Leaves plicate; stems reed-like; inflorescences lateral or terminal ..... Tribe **Tropidieae** (*Corymborkis*)
2b Anther erect, horizontally reflexed or pendent and rostellum much shorter than anther; root tubers almost always present; plants terrestrial or rarely epiphytic ..... Subfamily ORCHIDOIDEAE:
4a Anther erect or suberect; median sepal unspurred; petals not clawed and fimbriate; lip often spurred, always without large appendage ..... Tribe **Orchideae**
4b Anther horizontally reflexed or pendent; very rarely secondarily erect or suberect but then either median sepal spurred and large lip appendage present or petals clawed and fimbriate ..... Tribe **Diseae**
1b Plants epiphytic, epilithic or terrestrial, rarely lianas, frequently with corms or pseudobulbs but not with root tubers; leaves thin and soft, leathery or succulent; anther incumbent or rarely suberect, operculate; pollinia soft-mealy, sectile or hard and waxy ..... Subfamily EPIDENDROIDEAE:
5a Pollinia soft and mealy or sectile:
6a Pollinia 8, soft, but clearly defined ..... Tribe **Arethuseae** (*Calanthe*)
6b Pollinia 2 and sectile, or mealy and ill-defined:
7a Terrestrial plants with 1 green leaf that develops after the flowers; plants arising from subterraneous tubers; pollinia 2, sectile ..... Tribe **Nervilieae** (*Nervilia*)
7b Plants not as above:
8a Saprophytes; pollinia 2, sectile ..... Tribe **Gastrodieae**
8b Lianas with green stems; pollinia soft and mealy ..... Tribe **Vanilleae** (*Vanilla*)
5b Pollinia firm or hard, not sectile:
9a Pollinia naked, without caudicles and stipes; sometimes with viscidia:
10a Inflorescence terminal; plants with or without pseudobulbs, terrestrial or epiphytic ..... Tribe **Malaxideae**
10b Inflorescence lateral; plants with pseudobulbs, epiphytic ..... Tribe **Dendrobieae** (*Bulbophyllum*)
9b Pollinia with caudicles, often with viscidia and stipes:
11a Plants monopodial ..... Tribe **Vandeae**
11b Plants sympodial:
12a Plants mostly terrestrial; if epiphytic then with long fusiform leafy pseudobulbs and large yellow resupinate flowers with brown blotches ..... Tribe **Cymbidieae**
12b Plants always epiphytic; flowers small to medium-sized and not resupinate ..... Tribe **Epidendreae** (*Polystachya*)

SUBFAMILIES, TRIBES AND KEYS TO GENERA

Subfamily SPIRANTHOIDEAE

Tribe **Cranichideae**

1a Stems fleshy, long, prostrate in leaf litter and turning erect to flower:
2a Lateral sepals free ..... **Platylepis**
2b Lateral sepals fused for at least half their length ..... **Cheirostylis**
1b Stems erect, median sepal and petals connivent to form hood; flowers almost hidden by floral bracts; in our area recorded only from Botswana and Durban (KwaZulu-Natal) ..... **Zeuxine**

Tribe **Tropidieae**

Only one genus represented ..... **Corymborkis**

Subfamily ORCHIDOIDEAE

Tribe **Diseae**

1a Column-part elongate; sepals and petals spreading and similar; flowers not resupinate; anther almost always pendent (Subtribe Satyriinae):
2a Flowers irregular; lip spurs 2, almost always present, rarely saccate or obsolete; viscidia 1 or 2 ..... **Satyrium**
2b Flowers almost regular; spurs 0; viscidia 2 ..... **Pachites**
1b Column-part short or 0; sepals and petals not similar:
3a Petals spathulate, margins deeply fimbriate; anther thecae diverging at base (Subtribe Huttonaeinae) ..... **Huttonaea**
3b Petals entire or lobed, not spathulate:
4a Petals adnate to median sepal to form galea, median sepal spurred or not; lip ascending at base and fused with gynostemium (Subtribes Coryciinae and Brownleeinae):
5a Lateral sepals spurred or saccate; flowers resupinate ..... **Disperis**
5b Lateral sepals not spurred or saccate:
6a Median sepal with slender or clavate spur; flowers resupinate; lip shorter than gynostemium ..... **Brownleea**
6b Median sepal not spurred, but sometimes saccate; flowers resupinate or not:
7a Lip blade anchor-shaped, rhomboid or reniform:
8a Lip appendage present or 0; if present, deeply bilobed to near its base; underground organ cluster of furry roots, sometimes in addition root tubers present; gynostemium with short undifferentiated column-part... ..... **Ceratandra**
8b Lip appendage present, entire though apically bifid; underground organs root tubers; column-part 0 ..... **Evotella**

7b Lip blade not as above:
9a Median sepal and petals forming shallow hood ..... **Pterygodium**
9b Median sepal and petals forming deep globose hood, widespread; if median sepal rather shallow then lip appendage with prominent median keel on front side; flowers not resupinate and plants from southern Drakensberg (KwaZulu-Natal) and Eastern Cape ..... **Corycium**
4b Petals free from median sepal; lip not basally fused with gynostemium (Subtribe Disinae):
10a Lip complex, with ascending basal part, flat middle part and tooth-like mucronate apex ..... **Schizodium**
10b Lip simple, rarely lobed or fimbriate; viscidia 1 or 2 ..... **Disa**

Tribe **Orchideae**

1a Stigma sessile, undivided; borne in cavity below rostellum or on cushion or pad in front of gynostemium (Subtribe Orchidinae):
2a Stem with many lanceolate or broadly lanceolate leaves ..... **Brachycorythis**
2b Stem not densely leafy:
3a Leaves 1 or 2, basal and adpressed to ground, suborbicular or cordate, rarely withered at flowering time; stem erect, often hairy; sepals green, herbaceous, different in texture from petals; petals and lip often fimbriate:
4a Flowers 1, very rarely 2; sepals and petals subequal ..... **Bartholina**
4b Flowers more than 5; petals longer than sepals ..... **Holothrix**
3b Leaves not adpressed to ground; if basal and solitary then sepals white:
5a Leaves (3–)5–30; linear, narrowly lanceolate or narrowly elliptic, clustered in basal part of stem; inflorescence drooping; flowers not resupinate; sepals much longer than petals; lip with spur 0.2–6.0 mm long ..... **Schizochilus**
5b Leaves 1–3; basal; lip not spurred:
6a Leaf 1; sepals more than twice as long as petals ..... **Dracomonticola**
6b Leaves 2 or 3; sepals and petals subequal ..... **Neobolusia**
1b Stigmatic areas 2, convex or situated on stalks:
7a Petals undivided:
8a Flowers white or lilac:
9a Leaves few to many, spreading in basal rosette; lip with or without spur; underground organ cluster of tuberous roots ..... **Stenoglottis**
9b Leaves 1 or 2, basal and suberect; lip spurred; roots tuberous ..... **Cynorkis**
8b Flowers green or greenish yellow ..... **Habenaria** (in part)
7b Petals deeply bilobed; flowers green, green and white or yellowish green; lip always spurred:
10a Side lobes of lip fringed; stigmatic arms bilobed ..... **Centrostigma**
10b Side lobes of lip, if present, not fringed; stigmatic arms entire:
11a Lateral sepals, anterior petal lobe, and lip basally adnate to stigmatic arms; central rostellum lobe hood-like ... **Bonatea**
11b Lateral sepals, anterior petal lobe, and lip ± free from stigmatic arms ..... **Habenaria** (in part)

Subfamily EPIDENDROIDEAE

Tribe **Arethuseae**

Only one genus represented ..... **Calanthe**

Tribe **Cymbidieae**

1a Plants epiphytic; pseudobulbs elongate, leafy and narrowly fusiform; flowers large, yellow with brown blotches; spur 0.... ..... **Ansellia**
1b Plants terrestrial; pseudobulbs (if present) with leaves mainly from apex; spur present or 0:
2a Inflorescence terminal; pseudobulbs 0; leaves stiff, conduplicate ..... **Acrolophia**
2b Inflorescence lateral; pseudobulbs or corms present:
3a Lip mostly 4-lobed; pseudobulbs consisting of single node ..... **Oeceoclades**
3b Lip 3-lobed or entire; compressed pseudobulbs or corms consisting of more than one node, each new growth with several leaves ..... **Eulophia**

Tribe **Dendrobieae**

Only one genus represented ..... **Bulbophyllum**

Tribe **Epidendreae**

Only one genus represented ..... **Polystachya**

Tribe **Gastrodieae**

Flowers held upright, sepals and petals united at base only, fruiting pedicel elongating to 90–200 mm at maturity ..... **Didymoplexis**
Flowers drooping and bell-shaped, sepals and petals united, pedicels not elongating in fruit ..... **Gastrodia**

Tribe **Malaxideae**

Plants epiphytic, without pseudobulbs; leaves equitant and succulent, arranged in fan ..... **Oberonia**
Plants terrestrial or rarely epilithic or epiphytic; pseudobulbs present though sometimes small; leaves 2–4, ovate and flat, rather thin ..... **Liparis**

Tribe **Nervilieae**

Only one genus represented ..... **Nervilia**

Tribe **Vandeae**

1a Plants with fan of succulent, equitant and laterally compressed leaves; flowers small, white ..... **Bolusiella**
1b Plants not as above; leaves flat, keeled, cylindrical or 0:
2a Flowers yellow with purple markings; spur saccate ..... **Acampe**
2b Flowers white, cream-coloured or pale green; sometimes with darker tinges on apices of tepals and spur; spur various:
3a Plants leafless:
4a Stem elongate, up to 400 mm long; roots emerging all along its length ..... **Solenangis**
4b Stem shorter or plants almost stemless; roots arising from base:
5a Spur 1–6 mm long ..... **Microcoelia**
5b Spur 17–45 mm long:
6a Anther cap bright green; perianth campanulate with broadly rounded lobes ..... **Diaphananthe** (in part)
6b Anther cap yellow, brown or dull green; perianth lobes narrow and pointed ..... **Mystacidium** (in part)
3b Plants with green leaves:
7a Lip wide at base and encircling gynostemium; rostellum very short and emarginate ..... **Angraecum**
7b Lip inserted below gynostemium and normally not encircling it; rostellum various:
8a Flowers 1 or rarely 2 per inflorescence; rostellum short and emarginate ..... **Jumellea**
8b Flowers normally 3 or more; rostellum mostly beaked:
9a Flowers white; apical half of lip not or only shallowly 3-lobed:
10a Sepals and petals narrow and pointed, similar to lip ..... **Cyrtorchis**
10b Sepals and petals not as above:
11a Leaves conduplicate but flat in upper part; stipe 1, entire ..... **Aerangis**
11b Leaves V-shaped throughout; stipe(s) 1 or 2:
12a Stipe 1, Y-shaped, divided for nearly half its length; spur usually less than 45 mm long ..... **Ypsilopus**
12b Stipes 2, free to near base; spur 8–90 mm long:
13a Flowers star-like with broadly ovate-lanceolate perianth lobes; lateral sepals 9–11 mm long; spur 50–90 mm long ..... **Rangaeris**
13b Flowers not as above:
14a Lip ecallose; anther cap not bright green; spur mouth wide; sepals and petals mostly acute and often reflexed ..... **Mystacidium** (in part)
14b Lip mostly callose at base; if rarely without callus then anther cap conspicuously green and perianth campanulate with broadly obtuse sepals and petals ..... **Diaphananthe** (in part)
9b Flowers green, cream, pale brown or yellow; apical half of lip various:
15a Lip apically deeply 3-lobed, side lobes often fringed; stipe and viscidium 1 ..... **Tridactyle**
15b Lip apically not deeply 3-lobed; stipes 2:
16a Lip without callus; anther cap not bright green; spur mouth wide; sepals and petals often reflexed, acute ..... **Mystacidium** (in part)
16b Lip mostly with callus in spur mouth; if rarely without callus then anther cap conspicuously green, and sepals and petals broadly obtuse ..... **Diaphananthe** (in part)

Tribe **Vanilleae**

Only one genus represented ..... **Vanilla**

Artificial key to all southern African genera

1a Terrestrial herbs, rarely lianas creeping in bushes but rooting in ground; if growing on trees or rocks then with fleshy root tubers and thin, soft leaves: (1b on p. 649)
2a Pollinia in pouch-like structures without removable cap (subfamily Orchidoideae); underground organs almost always root tubers, rarely clusters of thick roots with furry sheath or bundles of thick fleshy roots (in the latter case leaves arranged in basal rosette): (2b on p. 648)
3a Gynostemium with significant basal column-part which is longer than wide; anther pendent:
4a Lip galeate, usually with 2 sacs or spurs at base ..... **Satyrium**
4b Lip flat, spurless; perianth lobes similar ..... **Pachites**
3b Gynostemium without prominent column-part:
5a Lip or its side lobes with fringed or lacerated margin:
6a Median sepal spurred ..... **Disa** sect. **Herschelianthe** (in part)

6b Median sepal not spurred:
7a Lip with large appendage ..... **Pterygodium** (in part)
7b Lip not appendiculate:
8a Leaves cauline:
9a Petals fringed ..... **Huttonaea**
9b Petals not fringed ..... **Centrostigma**
8b Leaves 1 or 2, basal, adpressed to ground:
10a Flowers large, almost always solitary ..... **Bartholina**
10b Flowers small, 3 to numerous ..... **Holothrix** (in part)
5b Lip not with fringed margin; if lobed then with less than 6 lobes:
11a Lateral sepals each with spur or sac ..... **Disperis**
11b Lateral sepals without spurs or sacs:
12a Lip spurred:
13a Receptive surface of stigmas on 2 projecting, club-shaped organs:
14a Flowers green, yellowish green, or green and white:
15a Lateral sepals and lower petal lobes fused to stigmatic arms ..... **Bonatea**
15b Lateral sepals and lower petal lobes not fused to stigmatic arms ..... **Habenaria**
14b Flowers pink or white, often with darker markings:
16a Leaves numerous, in basal rosette ..... **Stenoglottis** (in part)
16b Leaves 1 or 2, at base of stem ..... **Cynorkis**
13b Receptive surface of stigmas flat or concave, in cavity below rostellum:
17a Leaves scattered along stem ..... **Brachycorythis** (in part)
17b Leaves basal or clustered in lower stem portion:
18a Petals as long as or longer than sepals; inflorescences erect; leaves 1 or 2, adpressed to ground ..... **Holothrix** (in part)
18b Petals shorter than sepals; inflorescences normally nodding ..... **Schizochilus** (in part)
12b Lip not spurred:
19a Lip without appendage:
20a Lip basally erect and fused to gynostemium, anchor-shaped ..... **Ceratandra** (in part)
20b Lip not as above:
21a Stigmas 2, club-shaped ..... **Stenoglottis** (in part)
21b Stigma 1, not club-shaped:
22a Leaves grass-like, linear or narrowly lorate, basal:
23a Inflorescence apex nodding; sepals 2–4 mm long ..... **Schizochilus** (in part)
23b Inflorescence erect; flowers mostly larger ..... **Disa** sect. **Herschelianthe** (in part)
22b Leaves not basal and grass-like:
24a Lip linear or narrowly lorate, erect in front of gynostemium and shorter than it ..... **Brownleea**
24b Lip spreading or patent, as long as or longer than gynostemium:
25a Lip 3-lobed with prominent lobes:
26a Stem densely leafy ..... **Brachycorythis** (in part)
26b Stem only with sheaths ..... **Schizochilus** (in part)
25b Lip entire or with minute side lobes:
27a Lip fiddle-shaped, with large tooth-like apex ..... **Schizodium**
27b Lip linear to elliptic, apex not tooth-like:
28a Leaf 1; petals about half as long as sepals; inflorescence slightly nodding ..... **Dracomonticola**
28b Leaves 2 to several; petals ± as long as sepals; inflorescence erect:
29a Leaves 2 or 3, basal; median sepal unspurred; anther erect ..... **Neobolusia**
29b Leaves several; median sepal usually spurred; anther mostly reflexed to a horizontal or pendent position ..... **Disa** (in part)
19b Lip with prominent appendage:
30a Lip anchor-shaped or broadly rhomboid; leaves cauline, linear and ± equally long:
31a Lip appendage bilobed; plant with cluster of thick roots with furry sheath ..... **Ceratandra** (in part)
31b Lip appendage entire but apically bifid; plants with root tubers ..... **Evotella**
30b Lip not as above; leaves various:
32a Median sepal and petals forming shallow, concave hood ..... **Pterygodium** (in part)
32b Median sepal and petals forming deep globose hood, widespread; if median sepal rather shallow, then lip appendage with prominent median keel on front side, flowers not resupinate and plants from southern Drakensberg (KwaZulu-Natal) and Eastern Cape ..... **Corycium**
2b Pollinia at apex of gynostemium under removable anther cap; if anther cap insignificant or absent, underground organs not root tubers:
33a Plants saprophytic, without green organs:
34a Flowers in upright position; fruiting pedicel elongating to 90–200 mm when mature ..... **Didymoplexis**
34b Flowers bell-shaped and drooping; pedicels not elongating in fruit ..... **Gastrodia**
33b Plants not saprophytic:
35a Liana with leafless, green, succulent stems ..... **Vanilla**

35b Slender terrestrial herbs:
36a Plants with large single leaf appearing after flowering ..... **Nervilia**
36b Plants with several leaves which are always present at flowering:
37a Stems reed-like, 0.3–1 m long; flowers white, with narrow sepals and petals over 45 mm long ..... **Corymborkis**
37b Stems not reed-like:
38a Stems creeping in leaf litter and turning erect to flower:
39a Lateral sepals almost free ..... **Platylepis**
39b Lateral sepals united for at least half their length ..... **Cheirostylis**
38b Stems not creeping and turning erect to flower:
40a Gynostemium fused to lip ..... **Calanthe**
40b Gynostemium not fused to lip:
41a Inflorescence terminal:
42a Median sepal and petals connivent and forming hood; flowers nearly hidden by bracts ..... **Zeuxine**
42b Median sepal and petals not forming hood; bracts small:
43a Lip spurless; plants pseudobulbous; leaves thin-tissued ..... **Liparis**
43b Lip with short spur; plants without pseudobulbs; leaves leathery ..... **Acrolophia**
41b Inflorescence lateral:
44a Pseudobulbs usually consisting of single node; lip mostly 4-lobed ..... **Oeceoclades**
44b Pseudobulbs/underground corms consisting of more than one node; lip usually 3-lobed ..... **Eulophia**

1b Plants epiphytic on trees or shrubs, sometimes epilithic; always without root tubers:

45a Plants with fan of succulent and laterally compressed leaves; inflorescences terminal, with more than 50 small yellow flowers; Mpumalanga ..... **Oberonia**
45b Plants usually with flat, keeled or cylindrical leaves, or leafless; if rarely with fan of succulent and laterally compressed leaves then inflorescences lateral and flowers less than 20:
46a Pseudobulbs present:
47a Inflorescence lateral ..... **Bulbophyllum**
47b Inflorescence terminal:
48a Flowers resupinate, large; median sepal longer than 20 mm; roots growing upwards to form root-basket ..... **Ansellia**
48b Flowers not resupinate, small or medium-sized; median sepal shorter than 20 mm; roots growing downwards ..... **Polystachya** (in part)
46b Pseudobulbs absent:
49a Inflorescence terminal; growth sympodial; flowers not resupinate ..... **Polystachya** (in part)
49b Inflorescences lateral; growth monopodial (Tribe Vandeae):
50a Plants with fan of succulent, equitant and laterally compressed leaves ..... **Bolusiella**
50b Plants not with fan of succulent leaves; leaves flat, keeled, cylindrical or absent:
51a Flowers yellow with purple markings; spur saccate ..... **Acampe**
51b Flowers uniformly white, cream-coloured, or pale green; sometimes with darker tinges on apices of tepals and spur; spur various:
52a Plants leafless:
53a Stem very elongate, up to 400 mm long; roots emerging all along its length ..... **Solenangis**
53b Stem shorter or plants almost stemless; roots from base:
54a Spur 1–6 mm long ..... **Microcoelia**
54b Spur 17–45 mm long:
55a Anther cap bright green; perianth campanulate with broadly rounded lobes ..... **Diaphananthe** (in part)
55b Anther cap yellow, brown or dull green; perianth lobes narrow and pointed ..... **Mystacidium** (in part)
52b Plants with green leaves:
56a Lip wide at base and encircling gynostemium; rostellum very short and emarginate ..... **Angraecum**
56b Lip arising below gynostemium, and normally not encircling it; rostellum various:
57a Flowers 1 or rarely 2 per inflorescence; rostellum short and emarginate ..... **Jumellea**
57b Flowers normally 3 or more; rostellum mostly beaked:
58a Flowers white; apical half of lip not or only shallowly 3-lobed:
59a Sepals and petals narrow and pointed, similar to lip ..... **Cyrtorchis**
59b Sepals and petals not as above:
60a Leaves conduplicate but flat in upper part; stipe 1, entire ..... **Aerangis**
60b Leaves V-shaped throughout; stipes 1 or 2:
61a Stipe 1, Y-shaped, divided for nearly half its length; spur usually shorter than 45 mm .. **Ypsilopus**
61b Stipes 2, free to near base; spur 8–90 mm long:
62a Flowers star-like with broadly ovate-lanceolate perianth lobes; lateral sepals 9–11 mm long; spur 50–90 mm long ..... **Rangaeris**
62b Flowers not as above:
63a Lip ecallose; anther cap not bright green; spur mouth wide; sepals and petals mostly acute and often reflexed ..... **Mystacidium** (in part)
63b Lip mostly callose at base; if rarely without callus then anther cap conspicuously green and perianth campanulate with broadly obtuse sepals and petals ..... **Diaphananthe** (in part)

58b Flowers green, cream, pale brown or yellow; apical half of lip various:
64a Lip apically deeply 3-lobed, side lobes often fringed; stipe and viscidium solitary ..... **Tridactyle**
64b Lip apically not deeply 3-lobed; stipes 2:
65a Lip without callus; anther cap not bright green; spur mouth wide; sepals and petals often reflexed, acute ..... **Mystacidium** (in part)
65b Lip mostly with callus in spur mouth; if rarely without callus then anther cap conspicuously green, and sepals and petals broadly obtuse ..... **Diaphananthe** (in part)

Acampe Lindl. 1824000

(Epidendroideae—Vandeae)

Lindley: 1 (1853) name conserved; Schelpe: 36 (1966); Harrison: 39 (1972); Stewart *et al.*: 255 (1982); Linder & Kurzweil: 420 (1999).

Epiphytic monopodial herbs. **Stems** short or somewhat elongate, not thickened into pseudobulbs, leafy. **Leaves** distichous, spreading, coriaceous, fleshy, articulated to persistent sheath. **Inflorescences** lateral, racemose, corymbose or paniculate, shorter than leaves; flowers not resupinate, fleshy, small or medium-sized, yellow barred with red, with white lip; bracts small and scale-like. **Sepals** subequal, free, sometimes fleshy. **Petals** similar to sepals. **Lip** basally adnate to gynostemium, saccate or spurred at base, fleshy; disc smooth or with small appendage. **Gynostemium** short, broad; anther operculate, incumbent; pollinia 4, subglobose, united in pairs, attached by slender stipe to viscidium. **Capsule** ribbed. $x = 19$ (18).

Species 10, Old World tropics, mainly Asia; 1 in sthn Afr.: *Acampe pachyglossa* Rchb.f., Mpumalanga, Swaziland, and KwaZulu-Natal.

Acrolophia Pfitzer 1561000

(Epidendroideae—Cymbidieae)

Pfitzer: 59 (1887); Rolfe: 12 (1912); Phillips: 241 (1951); Schelpe: 26 (1966); Stewart *et al.*: 253 (1982); Linder & Kurzweil: 398 (1999).

Eulophia R.Br. sect. *Desciscentes* Lindl.: 184 (1833).

Terrestrial herbs, with thick roots with prominent velamen. **Leaves** distichous, coriaceous, persistent. **Inflorescences** terminal, panicles or racemes; flowers resupinate or not, maroon, brown or green, lip often yellow or white; bracts small. **Sepals** subequal, free, subconnivent or spreading. **Petals** similar to sepals. **Lip** 3-lobed or entire, saccate or spurred at base; disc variously papillose or crested. **Gynostemium**: anther terminal, operculate, often 2-horned; pollinia 4, united in pairs; stigma in cavity below rostellum. **Capsule** ovoid or oblong, with thickened angles.

Species 7, Zululand (KwaZulu-Natal) to Western Cape.

Aerangis Rchb.f. 1830000

(Epidendroideae—Vandeae)

Reichenbach: 190 (1865); Rolfe: 68 (1912) under *Angraecum*; Schelpe: 44 (1966); Harrison: 47 (1972); Stewart: 239 (1979); Stewart *et al.*: 262 (1982); Linder & Kurzweil: 427 (1999).

Epiphytic monopodial herbs, with short or elongate leafy stems, without pseudobulbs. **Leaves** distichous, ligulate to oblanceolate, flat, usually unequally bilobed at apex. **Inflorescences** lateral, short or long racemes, rarely branched, mainly pendulous; flowers usually white. **Sepals** and **petals** ± lanceolate-oblong, spreading, free. **Lip** elliptic to lanceolate-oblong, with long spur. **Gynostemium** short and broad; anther operculate, anther cap sometimes beaked; pollinia 2, attached by single stipe to single enlarged viscidium; rostellum entire, elongated. **Capsule** cylindrical or ellipsoid, often much enlarged. $x = 25$ (aneuploids, high polyploidy).

Species ± 50, Africa and Mascarene Islands; 3 (possibly 5) in sthn Afr., Mpumalanga, Swaziland, KwaZulu-Natal, and Eastern Cape.

Angraecum Bory 1828000

(Epidendroideae—Vandeae)

Bory: 359 (1804); Rolfe: 68 (1912); Phillips: 243 (1951); Schelpe: 38 (1966); Harrison: 85 (1972); Stewart *et al.*: 256 (1982); Linder & Kurzweil: 421 (1999).

Epiphytic monopodial herbs, with short to elongate leafy stems, without pseudobulbs. **Leaves** distichous, ± coriaceous, articulated to persistent sheath, often unequally 2-lobed. **Inflorescences** lateral, racemes, rarely flowers solitary; flowers often white or greenish white. **Sepals** and **petals** free, subsimilar. **Lip** concave, entire or 3-lobed, spurred, basally enveloping gynostemium. **Gynostemium** short and broad, lacking column-foot; anther operculate, incumbent; pollinia 2. **Capsule** oblong or fusiform. $x = 19$ (25) (aneuploids, polyploidy).

Species ± 200, Africa, Madagascar and Mascarene Islands, 1 in Sri Lanka; 6 widespread in subtropical parts of sthn Afr., including Swaziland, extending to Eastern Cape.

Ansellia Lindl. 1568000

(Epidendroideae—Cymbidieae)

Lindley: t. 12 (1844); Rolfe: 62 (1912); Phillips: 241 (1951); Schelpe: 32 (1966); Harrison: 8 (1972); Stewart *et al.*: 221 (1982); Linder & Kurzweil: 404 (1999).

Robust epiphytic herbs. **Stems** up to 1 m long, fusiform-pseudobulbous, leafy. **Leaves** distichous, plicate-veined. **Inflorescences** axillary panicles from apical nodes; flowers large, yellow or blotched with brown; bracts small. **Sepals** and **petals** similar. **Lip** 3-lobed; disc with 2 or 3 parallel keels. **Gynostemium** with prominent column-part and short column-foot; anther operculate and incumbent; pollinia 4 in 2 pairs, waxy; stigma in cavity below rostellum. **Capsule** ellipsoid, capped by persistent perianth-base. $x = 21$.

Species 1: *Ansellia africana* Lindl., variable, tropical Africa south to South Africa; N Namibia, N Botswana, Northern Province, Swaziland and KwaZulu-Natal.

Bartholina R.Br. 1416000

(Orchidoideae—Orchideae)

Brown in Aiton: 194 (1813); Rolfe: 94 (1912); Phillips: 231 (1951); Schelpe: 64 (1966); Stewart *et al.*: 66 (1982); Linder & Kurzweil: 94 (1999).

Terrestrial herbs, with small globose root tubers. **Leaf** solitary, basal and adpressed to ground, reniform-orbicular. **Inflorescence** normally 1-flowered, very rarely 2-flowered. **Sepals** subequal, free, erect, green. **Petals** white to mauve. **Lip** spurred, conspicuously fimbriate, with many linear segments, same colour as petals. **Gynostemium** with erect, parallel and adjacent anther thecae, anther canals very short; pollinia 2, sectile, with long caudicles attached to separate viscidia. **Capsule** cylindrical to ellipsoid, slightly curved.

Species 2, S Namibia, Northern, Western and Eastern Cape.

Bolusiella Schltr. 1828110

(Epidendroideae—Vandeae)

Schlechter: 105 (1918); Schelpe: 52 (1966); Harrison: 45 (1972); Stewart *et al.*: 262 (1982); Linder & Kurzweil: 431 (1999).

Angraecum in part; Rolfe: 73 (1912); Phillips: 243 (1951).

Epiphytic monopodial herbs, with short leafy stems, without pseudobulbs. **Leaves** distichous, equitant, suc-

culent, arranged in vertical plane forming fan. **Inflorescences** lateral, short racemes; bracts comparatively large; flowers small, white. **Sepals** lanceolate, acute to acuminate, free, spreading. **Petals** lanceolate, free. **Lip** entire or 3-lobed, with short cylindrical spur. **Gynostemium** short, without column-foot; anther operculate; pollinia 2, each attached by linear stipe to large ovate viscidium. **Capsule** ovoid. $x = 25$ (1 report).

Species 5, tropical and sthn Afr.; 1 in N KwaZulu-Natal: *Bolusiella maudiae* (Bolus) Schltr.

Bonatea Willd. 1422020

(Orchidoideae—Orchideae)

Willdenow: 43 (1805); Rolfe: 138 (1912); Phillips: 232 (1951); Schelpe: 74 (1966); Stewart *et al.*: 97 (1982); Linder & Kurzweil: 136 (1999).

Terrestrial herbs, with oblong tuberous roots. **Leaves** cauline, sometimes withered at flowering time. **Inflorescence** an elongated raceme, few- to many-flowered; flowers green or yellow and white; bracts ovate. **Sepals** unequal; median one erect, usually forming hood with upper petal lobe; laterals oblique and reflexed, united for some distance with base of lip, anterior petal lobes and stigmatic arms. **Petals** deeply 2-lobed, upper lobe usually adnate to median sepal, lower (anterior) lobe fused at base with stigmatic arms and lip. **Lip** spurred, 3-lobed, basally united with lateral sepals, petals and stigmatic arms; base usually with a distinct tooth in front of spur mouth. **Gynostemium**: anther thecae erect, parallel, adjacent, anther canals elongate and adnate to lateral rostellum arms; pollinia 2, sectile, with elongated caudicles and small separate viscidia; stigmatic areas 2, on elongate processes which are basally connate with lip; rostellum 3-lobed, midlobe usually hooded, lateral lobes long slender arms. **Capsule** oblong.

Species 20, Arabian Peninsula, E Africa to Western Cape; 10 in sthn Afr., fairly widespread, mainly in Northern Province, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

Brachycorythis Lindl. 1428000

(Orchidoideae—Orchideae)

Lindley: 363 (1838); Rolfe: 84 (1912) partly under *Platanthera*; Phillips: 233 (1951); Summerhayes: 226 (1955); Schelpe: 58 (1966); Stewart *et al.*: 72 (1982); Linder & Kurzweil: 80 (1999).

Terrestrial herbs, with undivided or palmate root tubers. **Leaves** cauline, densely imbricate, gradually decreasing in density and size upwards. **Inflorescence** a lax or dense raceme; flowers pink, purple, yellow or brown; bracts leafy, ovate to lanceolate. **Sepals** free; median one and petals often coherent, laterals ascending or spreading and recurved. **Petals** usually oblique and similar to median sepal, at base often adnate to gynostemium. **Lip** with saccate or spur-like lower part and entire or 2- or 3-lobed upper part. **Gynostemium**: anther erect, thecae parallel and adjacent, anther canals 0; pollinia 2, sectile, with short caudicles attached to separate viscidia; stigma fleshy and pad-like or concave. **Capsule** narrowly oblong. $x = 21$.

Species 33, Africa and tropical Asia; 7 in the sthn African summer-rainfall area, Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape to George (Western Cape).

Brownleea Harv. ex Lindl. 1433000

(Orchidoideae—Diseae)

Lindley: 16 (1842); Rolfe: 259 (1913); Schelpe: 96 (1966); Linder: 13 (1981a); Stewart *et al.*: 154 (1982); Linder & Kurzweil: 289 (1999).

Terrestrial herbs up to 0.6 m tall, with simple, ovoid root tubers. **Leaves** 1–3(–5), cauline, lanceolate to ovate, ± plicate. **Inflorescence** a capitate to elongate, dense or lax spike, rarely 1-flowered; flowers white to mauve. **Sepals**: median one galeate and spurred, adnate to petals; laterals spreading. **Petals** mostly oblong, sometimes with anticous lobe, basally fused to gynostemium. **Lip** narrow, often linear, with wide base fused to gynostemium, minute, entire. **Gynostemium**: anther erect or reflexed, with 2 parallel and adjacent thecae, auricles large; pollinia 2, sectile, attached by short caudicles to separate viscidia; stigma sessile at base of gynostemium; rostellum tall, 3-lobed. **Capsule** cylindrical or oblong, ribbed.

Species 7, Africa and Madagascar; 5 in eastern half of sthn Afr. from Northern Province, Mpumalanga, Free State, KwaZulu-Natal, Lesotho, Eastern Cape to Knysna (Western Cape).

Bulbophyllum Thouars 1705000

(Epidendroideae—Dendrobieae)

Thouars: t. 93 (1822) name conserved; Schelpe: 22 (1966); Harrison: 33 (1972); Vermeulen: 1 (1987); Stewart *et al.*: 218 (1982); Linder & Kurzweil: 416 (1999).

Megaclinium Lindl.: t. 989 (1826a); Rolfe: 9 (1912); Phillips: 242 (1951). *Cirrhopetalum* Lindl.: t. 832 (1824); Stewart *et al.*: 220 (1982).

Epiphytic herbs, with creeping rhizomes; pseudobulbs 3–5-angled. **Leaves** 1 or 2 at apex of pseudobulbs, coriaceous or fleshy. **Inflorescences** lateral, arising from base of pseudobulbs or rarely from rhizome, flowers racemose or umbellate, rarely solitary, sometimes terminal portion dilated into flattened structure along either side of which flowers and bracts are distichously arranged; flowers often small, fleshy, purple or yellow, often with green or brown tinge; bracts usually ovate or triangular. **Sepals**: median one free, erect or spreading; laterals free or adnate, united to column-foot to form ± prominent mentum. **Petals** mostly smaller and narrower than median sepal. **Lip** often small and fleshy, usually entire and ligulate, often mobile on column-foot, frequently ciliate. **Gynostemium** short, sometimes with lateral wings or apical stelidia; anther operculate, incumbent; pollinia 4 in 2 pairs, waxy, normally without appendages. **Capsule** ovoid or oblong. $x = 19$ (aneuploids).

Species ± 1000, throughout tropics and subtropics of the world; 4 species widespread in eastern half of sthn Afr. from Northern Province to Pondoland (Eastern Cape).

Calanthe R.Br. 1631000

(Epidendroideae—Arethuseae)

Brown: t. 573 (1821); Rolfe: 11 (1912); Phillips: 241 (1951); Schelpe: 24 (1966); Stewart *et al.*: 215 (1982); Linder & Kurzweil: 405 (1999).

Terrestrial or rarely epiphytic herbs, with long fibrous roots. **Stems** pseudobulbous, leafy, small and obscured. **Leaves** 2–several, petiolate, plicate, very thin, limb elliptic to oblong-lanceolate. **Inflorescence** a lateral raceme; scape erect, with several sheathing bracts towards base, ± pubescent; flowers often large, in our species white to pink; bracts lanceolate to ovate-lanceolate. **Sepals** subequal, free, usually widely spreading. **Petals** similar to sepals. **Lip** fused to gynostemium, spurred, 3-lobed, disc variously crested or lamellate. **Gynostemium** short; anther operculate, incumbent; pollinia 8, rather soft, clavate, viscidium elliptic or lanceolate; rostellum bifid. **Capsule** elliptic-oblong. $x = 10$ (aneuploids, high polyploidy).

Species ± 200, widespread in Asia, Australasia and Madagascar, 1 each in Africa and Central America; 1 in eastern parts of sthn Afr.: *Calanthe sylvatica* (Thouars) Lindl., Northern Province to Knysna (Western Cape).

Centrostigma Schltr. 1422010

(Orchidoideae—Orchideae)

Schlechter: 522 (1915a); Phillips: 232 (1951); Stewart *et al.*: 102 (1982); Linder & Kurzweil: 143 (1999).

Terrestrial herbs, with ovoid-globose root tubers. **Leaves** cauline and sheathing. **Inflorescence** a lax raceme; flowers white, cream-coloured or green. **Sepals** free; laterals spreading and lanceolate; median one galeate. **Petals** simple, ± as long as sepals, lying next to median sepal. **Lip** deeply 3-lobed, with fringed side lobes; long-spurred. **Gynostemium**: anther thecae parallel and adjacent, erect, anther canals slender, strongly curved upwards and adnate to lateral rostellum arms; pollinia 2, sectile, with long caudicles and small viscidia; stigmatic processes 2-lobed, each with upper sterile horn and capitate or clavate receptive lobe; rostellum 3-lobed, lateral rostellum lobes elongate horns curved upwards, midlobe erect and shorter than anther. **Capsule** elongate-cylindrical.

Species 3, south tropical Africa; 1 extends into Northern Province and Mpumalanga: *Centrostigma occultans* (Welw. ex Rchb.f.) Schltr.

Ceratandra Eckl. ex F.A.Bauer 1439000

(Orchidoideae—Diseae)

Bauer: vol. 4, t. 16 (1837); Rolfe: 265 (1913); Phillips: 238 (1951); Schelpe: 98 (1966); Stewart *et al.*: 180 (1982); Kurzweil *et al.*: 213 (1991); Linder & Kurzweil: 320 (1999).

Ceratandropsis Rolfe: 266 (1913); Phillips: 238 (1951). *Evota* Rolfe: 268 (1913); Phillips: 238 (1951); Schelpe: 100 (1966); Stewart *et al.*: 182 (1982).

Terrestrial herbs, with fascicles of furry roots, sometimes also with small tubers. **Leaves** cauline, linear to lanceolate; basal cluster of linear leaves often present. **Inflorescence** a lax or dense, elongate or corymbose raceme; bracts linear and often marginally ciliate; flowers resupinate or not, yellow or pink and white. **Sepals**: median one mostly adnate to petals and ± reflexed; laterals spreading. **Petals** mostly unlobed, lanceolate-ovate. **Lip** basally fused with gynostemium, anchor-shaped, reniform or broadly lanceolate, with or without appendage, frequently with laminar callus. **Gynostemium** sometimes shortly stalked; anther thecae pendent and apparent as pair of erect or diverging arms (covered by flat rostellum), each with viscidium at its apex, anther canals diverging, short or long; pollinia 2, sectile, often with long caudicles; stigma convex cushions in median portion of rostellum, at dorsal face of gynostemium. **Capsule** oblong, ribbed.

Species 6, mainly Western Cape, extending into Eastern Cape.

Cheirostylis Blume 1503010

(Spiranthoideae—Cranichidae)

Blume: 413, t. 16 (1825); Stewart *et al.*: 213 (1982); Linder & Kurzweil: 76 (1999).

Terrestrial herbs, with creeping rhizomes and ascending or erect, simple, leafy stems. **Leaves** petiolate, ovate or lanceolate, membranous. **Inflorescence** a terminal, lax raceme, pubescent; flowers small, white or brown; bracts small. **Sepals** united in lower half, connivent or spreading, equal or laterals slightly broader. **Petals** adnate to median sepal. **Lip** united with base of gynostemium, base saccate with 2 calli inside, limb entire or divaricately bilobed. **Gynostemium** short, with pair of appendages beneath stigma; anther erect or somewhat incumbent; pollinia 2, sectile, attached to single viscidium. **Capsule** erect, ovoid or oblong. $x = 13$.

Species ± 22, in Old World tropics and subtropics; 1 in KwaZulu-Natal: *Cheirostylis gymnochiloides* (Ridl.) Rchb.f. (previously misidentified as *Hetaeria*).

Corycium Sw. 1440000

(Orchidoideae—Diseae)

Swartz: 220 (1800); Rolfe: 281 (1913); Phillips: 239 (1951); Schelpe: 106 (1966); Stewart *et al.*: 190 (1982); Kurzweil *et al.*: 217 (1991); Linder & Kurzweil: 339 (1999).

Terrestrial herbs, with root tubers. **Leaves** cauline and basally clustered, narrowly lanceolate, imbricate, flat or sometimes strongly undulate. **Inflorescence** a dense raceme, many- or few-flowered; flowers normally globose or semiglobose with narrow entrance, resupinate or very rarely nonresupinate, yellow, pink, purple or green; bracts fresh at anthesis but sometimes with dry apices. **Sepals** mostly fresh at flowering time, sometimes dry and black; median one adnate to petals; laterals ± fused in basal portion. **Petals** frequently with posterior sac. **Lip** basally fused with gynostemium, with flat and wide claw, dilated above into bilobed, transversely lunate, or rarely oblong limb, with stalked shield-like appendage with variously shaped lateral or dorsal processes, rarely appendage elongate or hood-like. **Gynostemium**: structure very complicated; anther thecae horizontally reflexed or semipendent, situated at far corners of long horseshoe-shaped connective; pollinia 2, sectile, viscidia separate; stigmas convex cushions in median portion of gynostemium, facing upwards, sideways, or downwards. **Capsule** elliptic or oblong, usually much narrowed above, ribbed.

Species 14, widespread in sthn Afr., extending into Malawi and S Tanzania.

Corymborkis Thouars 1531000

(Spiranthoideae—Tropidieae)

Thouars: 318 (1809); Thouars: t. 37 & t. 38 (1822) as *Corymborchis*; Rasmussen: 167 (1977); Stewart *et al.*: 210 (1982); Linder & Kurzweil: 73 (1999).

Corymbis Lindl.: 183 (1847); Rolfe: 80 (1912); Phillips: 240 (1951).

Terrestrial herbs with reed-like stems and fibrous roots. **Leaves** large, elliptic-lanceolate, plicate. **Inflorescences** axillary panicles; flowers white. **Sepals** and **petals** long, linear, subequal. **Lip** similar but broadly ovate at apex, often bituberculate at base. **Gynostemium** long and slender; anther erect; pollinia 2, sectile, long and slender caudicle attached to single viscidium; stigma broad, 3-lobed. **Capsule** subterete, with remains of perianth and gynostemium.

Species 5, Old and New World tropics; 1 extending to KwaZulu-Natal and Eastern Cape (Transkei): *Corymborkis corymbis* Thouars.

Cynorkis Thouars 1421000

(Orchidoideae—Orchideae)

Thouars: 317 (1809); Rolfe: 143 (1912) as *Cynorchis*; Phillips: 231 (1951) as *Cynorchis*; Stewart *et al.*: 79 (1982); Linder & Kurzweil: 144 (1999).

Terrestrial herbs, with fasciculate fleshy roots or root tubers. **Leaves** radical, 1–few. **Inflorescence** a short or elongated raceme; flowers pink to mauve or white; bracts small and narrow. **Sepals** subequal; median one often forming hood with petals; laterals oblique, spreading. **Petals** entire, narrower than median sepal. **Lip** usually larger than sepals and petals, spurred at base, 3–5-lobed. **Gynostemium** short and broad; anther thecae parallel and adjacent, anther canals short or long; pollinia 2, sectile, connected to slender caudicles attached to separate viscidia; stigmatic areas on 2 oblong or clavate processes; rostellum several-lobed. **Capsule** erect, oblong, sometimes shortly beaked. $x = 7$ (1 report).

Species ± 125, mostly Madagascar and Mascarene Islands, spreading into Africa; 2 widespread in northern and eastern parts of sthn Afr.

Cyrtorchis Schltr. 1835010

(Epidendroideae—Vandeae)

Schlechter: 595 (1914); Rolfe: 74 (1912) under *Listrostachys*; Phillips: 243 (1951) under *Listrostachys*; Summerhayes: 145 (1960); Schelpe: 42 (1966); Harrison: 71 (1972); Stewart *et al.*: 271 (1982); Linder & Kurzweil: 431 (1999).

Epiphytic or epilithic monopodial herbs, with stems elongate and sometimes branched, without pseudobulbs. **Leaves** distichous, sheathing, often imbricate, usually spreading or recurved, oblong to linear, fleshy and somewhat succulent or leathery. **Inflorescences** few- to many-flowered axillary racemes; flowers white becoming orange; bracts conspicuous, brownish. **Sepals** and **petals** free, lanceolate. **Lip** similar, long-spurred. **Gynostemium** short and thick, without column-foot; anther operculate, with beak; pollinia 2, with separate stipes and single viscidium; rostellum long, beak-like, projecting forward. **Capsule** with 3 or 6 wings. $x = 23$ (polyploidy).

Species ± 16, Africa; 2 in sthn Afr., from Northern Province as far south as Knysna (Western Cape).

Diaphananthe Schltr. 1828040

(Epidendroideae—Vandeae)

Schlechter: 593 (1914); Schlechter: 95 (1918); Summerhayes: 140 (1960); Schelpe: 46 (1966); Harrison: 41 (1972); Stewart *et al.*: 261 (1982); Linder & Kurzweil: 434 (1999).

Rhipidoglossum Schltr.: 80 (1918). *Mystacidium* Lindl. in part; Rolfe: 76 (1912); Phillips: 243 (1951).

Epiphytic monopodial herbs with short or elongate leafy stems, without pseudobulbs. **Leaves** distichous, ligulate, flat to weakly keeled, unequally bilobed at apex. **Inflorescences** few- to many-flowered racemes; flowers often translucent, white to yellow-green or beige; bracts usually amplexicaul, rarely prominent. **Sepals** and **petals** free, subsimilar. **Lip** entire or obscurely lobed, with curved spur, often with tooth-like callus at its mouth. **Gynostemium** short and broad, with or without column-foot; anther operculate; pollinia 2; stipes separate, viscidia 1 or 2; rostellum elongate, tapering or clavate. $x = 25$ (polyploidy).

Species ± 50, tropical and subtropical Africa; 4 in sthn Afr., south to Eastern Cape.

Didymoplexis Griff. 1487000

(Epidendroideae—Gastrodieae)

Griffith: 383 (1844); Stewart *et al.*: 210 (1982); Linder & Kurzweil: 351 (1999).

Terrestrial, saprophytic, pinkish brown plants with tuberous rhizomes. **Stems** erect, bearing terminal inflorescences. **Leaves** 0. **Inflorescence** a raceme, with 1–few white flowers. **Sepals** and **petals** basally united. **Lip** 3-lobed, with lamellae and warty outgrowths. **Gynostemium** short, with short teeth at apex. **Fruiting pedicel** lengthening to 90–200 mm at maturity. **Capsule** cylindrical, to 20 mm long.

Species 20, in Asian tropics, extending to Africa; 1 in Zululand (N KwaZulu-Natal): *Didymoplexis verrucosa* J.L.Stewart & Hennessy.

Disa P.J.Bergius 1434000

(Orchidoideae—Diseae)

Bergius: 348 (1767); Rolfe: 210 (1913); Schelpe: 90 (1966); Linder: 11 (1981c); Linder: 262 (1981d); Stewart *et al.*: 103 (1982); Linder & Kurzweil: 187 (1999).

Monadenia Lindl.: 356 (1838); Rolfe: 186 (1912); Schelpe: 82 (1966); Linder: 339 (1981e); Stewart *et al.*: 148 (1982). *Penthea* Lindl.: 360 (1838); Rolfe: 208 (1913); Schelpe: 88 (1966). *Herschelia* Lindl.: 362 (1838); Rolfe: 199 (1913); Schelpe: 86 (1966); Linder: 365 (1981f); Stewart *et al.*: 143 (1982). *Forficaria* Lindl.: 362 (1838); Rolfe: 207 (1913). *Orthopenthea* Rolfe: 179 (1912); Schelpe: 80 (1966). *Amphigena* Rolfe: 197 (1913); Schelpe: 84 (1966). *Herschelianthe* Rauschert: 433 (1983).

Terrestrial herbs, very rarely epilithic or epiphytic. **Stems** robust or slender, 0.1–1.0 m tall, with globose or elongate root tubers; occasionally with sterile shoots. **Leaves** radical, basal or cauline, linear to lanceolate and ovate, conduplicate or flat; green at flowering time, rarely hysteranthous. **Inflorescence**: raceme or corymb, lax or dense, few- or many-flowered, rarely one-flowered; flowers resupinate or not resupinate, very rarely doubly resupinate; various shades of white, red, pink, yellow, green, brown, purple or blue; bracts usually lanceolate and acute, sometimes dry and membranous. **Sepals** free, often apiculate; median sepal galeate and normally spurred, spur elongate or sac-like, sometimes obsolete; lateral sepals flat or navicular, spreading, patent or recurved. **Petals** usually smaller than sepals, ovate-oblong to falcate, basally fused with gynostemium, almost always with prominent anticous lobe, apically often bilobed. **Lip** linear, narrowly lanceolate, lorate, spathulate or broadly ovate, patent or pendent, margins sometimes crenulate or fringed (some species of *Disa* sect. *Herschelianthe*). **Gynostemium** with erect, horizontally reflexed or pendent anther, thecae parallel and adjacent, anther canals not prominent; pollinia 2, sectile, attached by short or long caudicles to 2 viscidia or rarely to 1 viscidium (*Disa* sect. *Monadenia*); stigma pad-like, pedicellate or sessile; rostellum 3-lobed or unlobed, if 3-lobed with square or horn-like lateral lobes and insignificant or rarely tall and finger-like central lobe. **Ovary** twisted or untwisted. **Capsule** cylindrical or narrowly ellipsoid. $x = 19$ (aneuploids, polyploidy).

Species ± 162, Africa, Arabian Peninsula, Madagascar and Mascarene Islands; 131 in sthn Afr., widespread.

Disperis Sw. 1437000

(Orchidoideae—Diseae)

Swartz: 218 (1800); Rolfe: 291 (1913); Phillips: 237 (1951); Schelpe: 108 (1966); Stewart *et al.*: 195 (1982); Linder & Kurzweil: 299 (1999).

Terrestrial slender herbs, with ovoid root tubers, often delicate plants. **Leaves** 1–few, alternate or sometimes in opposite pairs. **Inflorescence** a lax, terminal raceme, or flowers solitary; flowers white, yellow, green or pink; bracts sometimes foliaceous. **Sepals** free; median one galeate, adnate to petals to form hood, sometimes saccate or spurred; laterals oblique, generally saccate or spurred. **Petals** variously shaped, often falcately curved, sometimes auriculate. **Lip** ascending along face of gynostemium and basally fused to it, often clawed, variously dilated above, bearing variously shaped appendage directed towards apex of median sepal, lip appendage frequently very large. **Gynostemium**: anther thecae parallel and adjacent, horizontally reflexed, anther canals not prominent; pollinia 2, sectile, with separate viscidia; stigma a slightly convex cushion at base of gynostemium or two separate areas on central rostellum lobe; rostellum with large, flat central lobe covering thecae, and 2 rigid lateral arms holding viscidia. **Capsule** cylindrical or ovoid, ribbed.

Species ± 84, mainly Africa and Madagascar, extending into East Asia; 26 in sthn Afr., widespread.

Dracomonticola H.P.Linder & Kurzweil 1431010

(Orchidoideae—Orchideae)

Linder & Kurzweil: 230 (1995); Rolfe: 87 (1912) under *Brachycorythis*; Schelpe: 60 (1966) under *Neobolusia*; Stewart *et al.*: 71 (1982) under *Neobolusia*; Linder & Kurzweil: 87 (1999).

Small terrestrial herbs, with root tubers. **Leaf** solitary, basal, elliptic. **Inflorescence** subcapitate with few flow-

ers, slightly drooping; flowers white with pale pink petals and lip; bracts lanceolate, somewhat longer than ovary. **Sepals** subequal, narrowly elliptic. **Petals** oblong-ovate, obtuse, less than half as long as sepals. **Lip** subpandurate, unspurred, basal portion narrow and saccate, apical portion with two minute side lobes. **Gynostemium**: anther thecae slightly reflexed, parallel and adjacent, anther canals absent; pollinia 2, sectile, with separate viscidia; stigma concave, with short process.

Species 1: *Dracomonticola virginea* (Bolus) H.P. Linder & Kurzweil, in Drakensberg range (KwaZulu-Natal, Lesotho), rock crevices and grassy ledges.

Eulophia R.Br. ex Lindl. 1648000

(Epidendroideae—Cymbidieae)

Lindley: t. 686 (1822) name conserved; Rolfe: 17 (1912); Phillips: 242 (1951); Hall: 1 (1965); Schelpe: 28 (1966); Stewart *et al.*: 229 (1982); Linder & Kurzweil: 363 (1999).

Lissochilus R.Br. in Lindley: t. 573 (1821); Rolfe: 54 (1912); Phillips: 242 (1951).

Terrestrial herbs, rarely lithophytic. **Stems** most commonly underground and cormous, sometimes thickened into aerial pseudobulbs, frequently corms chain-like and thus forming rhizomes. **Leaves** basal, distichous, usually plicate, soft or leathery, rarely succulent. **Inflorescences** lateral, usually racemose, rarely branched; flowers medium-sized to large, resupinate or rarely not, colour various. **Sepals** subequal, free, connivent, spreading or reflexed. **Petals** similar to sepals or broader, often differently coloured. **Lip** 3-lobed or subentire, base saccate or spurred, disc variously cristate, lamellate, or smooth. **Gynostemium** sometimes produced into column-foot at base; anther operculate, incumbent; pollinia 2, stipe solitary, oblong to triangular, viscidium 1, elliptic or lunate. **Capsule** oblong or somewhat linear, with prominent thickened angles. $x = 27$ (aneuploids, high polyploidy).

Species ± 250, pantropical; 42 in sthn Afr., widespread.

Evotella Kurzweil & H.P.Linder 1439030

(Orchidoideae—Diseae)

Kurzweil *et al.*: 215 (1991); Linder & Kurzweil: 325 (1999).

Terrestrial herbs with root tubers. **Leaves** cauline, linear. **Inflorescence** a ± dense raceme; flowers resupinate, cup-shaped with red petals and white lip; bracts ovate-acute. **Sepals**: median one adnate to petals, lanceolate; laterals spreading, free. **Petals** with basal anterior lobe. **Lip** basally fused with gynostemium, triangular-hastate, subacute, with flat, wide and pendent claw, with tall, erect, entire but bifid appendage at base. **Gynostemium**: anther with semipendent thecae, anther canals not prominent; pollinia 2, sectile; stigmas and viscidia on terminal rostellum portions. **Capsule** cylindrical.

Species 1: *Evotella rubiginosa* (Sond. ex Bolus) Kurzweil & H.P.Linder, Western Cape; rare.

Gastrodia R.Br. 1486000

(Epidendroideae—Gastrodieae)

Brown: 330 (1810); Stewart *et al.*: 210 (1982); Linder & Kurzweil: 352 (1999).

Saprophytic terrestrial herbs, growing from thick, tuberous rhizomes. **Stems** erect. **Leaves** 0. **Inflorescence**: terminal racemes; flowers brownish, bell-shaped, pendent. **Sepals** and **petals** united into tube. **Lip** 3-lobed, mobile, attached to column-foot. **Gynostemium** long; pollinia 2, sectile. **Capsule** erect, up to 17 x 7 mm. $x = 12$ (aneuploids, polyploidy).

Species ± 17, throughout the tropics and subtropics of the Old World; 1 in sthn Afr.: *Gastrodia sesamoides* R.Br., near Cape Town (Western Cape); probably accidentally introduced.

Habenaria Willd. 1422000

(Orchidoideae—Orchideae)

Willdenow: 44 (1805); Rolfe: 117 (1912); Phillips: 231 (1951); Schelpe: 72 (1966); Stewart *et al.*: 82 (1982); Linder & Kurzweil: 110 (1999).

Terrestrial herbs, with globose or palmate root tubers. **Leaves** radical and adpressed to ground or cauline. **Inflorescence** lax or dense, racemose; flowers normally resupinate, white and/or green, rarely yellow, orange or pink; bracts mainly narrow. **Sepals** unequal, free; laterals spreading; median one often forming hood with petals or with upper petal lobe. **Petals** simple or deeply bilobed, usually narrower than median sepal, lower lobe sometimes descending and simulating lip lobe. **Lip** often shortly adnate to gynostemium, spurred, entire or variously lobed. **Gynostemium**: anther thecae parallel or diverging, adjacent or separated by wide connective, anther canals short or much elongated and adnate to lateral rostellum arms; pollinia 2, sectile, with caudicles attached to small viscidia; stigma extended into 2 short or elongate, often clavate processes; rostellum 3-lobed, lateral lobes divergent and short or long, central lobe various. **Capsule** oblong or ellipsoid, sometimes beaked. $x = 21$ (aneuploids, high polyploidy).

Species ± 800, throughout tropics and subtropics of the world; 35 widespread in northern and eastern parts of sthn Afr.

Holothrix Rich. ex Lindl. 1408000

(Orchidoideae—Orchideae)

Lindley: 283 (1835) name conserved; Rolfe: 96 (1912); Phillips: 230 (1951); Schelpe: 66 (1966); Stewart *et al.*: 58 (1982); Linder & Kurzweil: 96 (1999).

Terrestrial or sometimes lithophytic herbs, with root tubers. **Leaves** 2 (rarely 1), flat on ground, glabrous or hairy, sometimes withering before flowering, broadly ovate to orbicular-reniform. **Inflorescence** a usually secund, hairy raceme; flowers white, yellowish or green; normally resupinate; in *H. burchellii* (Lindl.) Rchb.f. flowers dimorphic. **Sepals** subequal, connivent. **Petals** longer than sepals, entire or variously lobed. **Lip** spurred, divided into 3–many lobes. **Gynostemium** short; anther thecae parallel and adjacent, anther canals absent; pollinia 2, sectile, with very short caudicles. **Capsule** ovoid or oblong.

Species ± 55, Arabian Peninsula, Africa; 23 in sthn Afr., widespread, often under arid conditions.

Huttonaea Harv. 1414000

(Orchidoideae—Diseae)

Harvey: vol. 2: 1 (1863); Rolfe: 111 (1912); Phillips: 231 (1951); Schelpe: 68 (1966); Stewart *et al.*: 68 (1982); Linder & Kurzweil: 295 (1999).

Terrestrial herbs, with ovoid root tubers. **Leaves** few, cauline, soft, decreasing progressively in size up stem. **Inflorescence** a short and few-flowered raceme; flowers white to mauve; bracts lanceolate. **Sepals** ovate to lanceolate; laterals larger and broader, oblique. **Petals** clawed, limb broad and fimbriate. **Lip** fimbriate, unspurred. **Gynostemium** short and broad; anther thecae adjacent at their apices and somewhat diverging towards base, anther canals not prominent; pollinia 2, sectile, with somewhat elongated caudicles attached to separate viscidia. **Capsule** oblong.

Species 5, Mpumalanga, E Free State, KwaZulu-Natal and Eastern Cape.

Jumellea Schltr. 1828140

(Epidendroideae—Vandeae)

Schlechter: 609 (1914); Schlechter: 150 (1918); Schelpe: 42 (1966); Harrison: 77 (1972); Stewart *et al.*: 260 (1982); Linder & Kurzweil: 425 (1999).

Epiphytic monopodial herbs, with short or long leafy stems, without pseudobulbs. **Leaves** linear-oblong, leathery, equally or unequally bilobed at apex. **Inflorescences** 1- or rarely 2-flowered, axillary; flowers small or medium-sized, white. **Sepals** and **petals** linear-lanceolate, free petals connivent with base of lip. **Lip** lanceolate, with long tapering spur. **Gynostemium** short and thick, with short column-foot; anther operculate, incumbent; pollinia 2, each attached by short stipe to large viscidium. **Capsule** narrowly ovoid, dehiscing by means of single fissure.

Species ± 45, centred in Madagascar and Mascarene Islands, 2 on African continent; 1 in subtropical parts of Mpumalanga and KwaZulu-Natal: *Jumellea filicornoides* (De Wild.) Schltr.

Liparis Rich. 1556000

(Epidendroideae—Malaxideae)

Richard: 21, 30, 38 (1817) name conserved; Rolfe: 8 (1912); Phillips: 240 (1951); Schelpe: 20 (1966); Stewart *et al.*: 216 (1982); Linder & Kurzweil: 359 (1999).

Terrestrial or sometimes low-level epiphytic herbs, with or without pseudobulbs. **Leaves** 2–few, sheathing at base. **Inflorescences** terminal, lax or dense racemes; flowers usually yellowish green or purplish; bracts small. **Sepals** spreading, free or laterals ± connate at base. **Petals** very narrow. **Lip** usually deflexed or recurved above erect base, simple or bilobed, margins entire or dentate, often bituberculate at base. **Gynostemium** usually long and slender, incurved, often winged at apex; anther operculate; pollinia 4. **Capsule** cylindrical to ellipsoid. $x = 10$ (aneuploids, polyploidy).

Species ± 250, cosmopolitan; 4 in northern, eastern and southwestern parts of sthn Afr.

Microcoelia Lindl. 1828120

(Epidendroideae—Vandeae)

Lindley: 60 (1830); Summerhayes: 140 (1943); Schelpe: 48 (1966); Harrison: 43 (1972); Jonsson: 1 (1981); Stewart *et al.*: 260 (1982); Linder & Kurzweil: 437 (1999).

Angraecum in part; Rolfe: 74 (1912); Phillips: 243 (1951).

Leafless epiphytic herbs with short monopodial stems and simple or branched roots, without pseudobulbs. **Inflorescences** few to many, racemose; flowers small, white, often with green or orange tinge; bracts usually very small, sheathing at base. **Sepals** free, usually ± connivent, lanceolate or ovate. **Petals** free, similar to sepals, often smaller. **Lip** entire or slightly 3-lobed at base, free, with cylindrical or globose spur. **Gynostemium** fleshy; with operculate anther; pollinia 2, stipe club-shaped, viscidium linear or oblong; rostellum bifid. **Capsule** ellipsoid to oblong. $x = 12$ (polyploidy).

Species ± 27, Africa and Madagascar; 2 in KwaZulu-Natal.

Mystacidium Lindl. 1837000

(Epidendroideae—Vandeae)

Lindley in Hooker: 205 (1836); Rolfe: 75 (1912); Phillips: 243 (1951); Schelpe: 40 (1966); Harrison: 53 (1972); Stewart *et al.*: 267 (1982); Linder & Kurzweil: 439 (1999).

Epiphytic monopodial herbs, small, with or rarely without leaves, without pseudobulbs. **Leaves** distichous, articulated to persistent sheath. **Inflorescences** axillary, 2–several-flowered; flowers small to medium-sized, white, green or yellowish white. **Sepals** and **petals** subequal, free, spreading or subconnivent. **Lip** entire or 3-lobed, spurred. **Gynostemium** short and broad; anther operculate; pollinia 2, globose, each attached to separate slender stipe and viscidium, viscidia rarely adherent; rostellum pendent, 3-lobed. **Capsule** oblong or fusiform. $x = 12$ (1 report).

Species ± 9, mainly southern and south-central Africa; 7 in sthn Afr., south to near Knysna (Western Cape).

Neobolusia Schltr. 1429000

(Orchidoideae—Orchideae)

Schlechter: 5 (1895); Rolfe: 84 (1912) under *Brachycorythis*; Schelpe: 60 (1966); Stewart *et al.*: 71 (1982); Linder & Kurzweil: 85 (1999).

Terrestrial herbs, up to 0.5 m tall, with small ovate root tubers. **Stems** slender. **Leaves** 2 or 3, basal. **Inflorescence** a few-flowered raceme; flowers with green sepals, petals and lip whitish; bracts ovate-lanceolate. **Sepals**: median one ovate to ovate-oblong, cohering with petals to form hood; laterals somewhat oblique, spreading. **Petals** obliquely ovate, basally fused to gynostemium. **Lip** spurless, base concave, disc simple or 3-lobed. **Gynostemium**: erect anther with parallel and adjacent thecae without prominent anther canals; pollinia 2, sectile, attached by short caudicles to rather large viscidia; stigma fleshy pad or cushion; rostellum 3-lobed, central lobe small. **Capsule** narrowly oblong.

Species 3, in eastern, central and sthn Afr.; 1 in montane grassland in eastern half of sthn Afr.: *Neobolusia tysonii* (Bolus) Schltr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal, Lesotho and Eastern Cape.

Nervilia Comm. ex Gaudich. 1468000

(Epidendroideae—Nervilieae)

Gaudichaud in Freycinet: 421 (1829); Schelpe: 56 (1966); Rolfe: 83 (1912) as *Pogonia*; Phillips: 239 (1951) as *Pogonia*; Stewart *et al.*: 213 (1982); Pettersson: 1 (1991); Linder & Kurzweil: 354 (1999).

Terrestrial herbs, with ovoid tubers. **Leaf** solitary, ovate, reniform or orbicular, developed after flowers. **Inflorescence** 1- to several-flowered; flowers resupinate or erect, brown, yellow or reddish green; lip white and often with red markings. **Sepals** subequal, free, erect or rarely spreading. **Petals** similar to sepals but often broader and shorter. **Lip** entire or 3-lobed with side lobes enfolding gynostemium, unspurred, disc variously crested, lamellate. **Gynostemium** elongate; anther operculate, incumbent; pollinia 2, sectile. **Capsule** ellipsoid, in our species mostly beaked. $x = 9$ (high polyploidy).

Species ± 60, Africa, Asia and Australia; 5 in northeastern parts of sthn Afr. (Northern Province, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal).

Oberonia Lindl. 1558000

(Epidendroideae—Malaxideae)

Lindley: 15 (1830) name conserved; Stewart *et al.*: 215 (1982); Linder & Kurzweil: 362 (1999).

Epiphytic herbs without pseudobulbs. **Leaves** equitant, ± succulent, distichous. **Inflorescences** terminal, racemose or verticillate, densely many-flowered; flowers nonresupinate, small, yellow, brown, green or orange. **Sepals** free, subequal, spreading or deflexed. **Petals** mostly smaller. **Lip** sessile, entire, or 2–4-lobed. **Gynostemium** very short; anther terminal, operculate, incumbent; pollinia 4. **Capsule** round. $x = 15$ (polyploidy).

Species ± 100, mainly Asian tropics but extending into Australasia and Africa; 1 in South Africa (Mpumalanga): *Oberonia disticha* (Lam.) Schltr.

Oeceoclades Lindl. 1648020

(Epidendroideae—Cymbidieae)

Lindley: t. 1522 (1832a); Stewart *et al.*: 251 (1982); Linder & Kurzweil: 395 (1999).

Eulophidium Pfitz.: 87 (1887); Schelpe: 30 (1966).

Terrestrial or rarely epiphytic herbs, usually with heteroblastic pseudobulbs (with only 1 internode elongated). **Leaves** 1–3, at apex of pseudobulb, petiolate, lamina coriaceous, conduplicate, often variegated; petiole articulation usually some distance above base and sometimes above middle, articulation consisting of a number of blunt or acute teeth. **Inflorescence** lateral, raceme or panicle, often overtopping leaves; flowers small to medium-sized, in our species greenish yellow, bright yellow or green, lip paler and often with red markings; bracts not conspicuous. **Sepals** and **petals** rather similar, or petals shorter and broader than sepals. **Lip** decurved, spurred, normally 4-lobed; disc with calli or keels. **Gynostemium** sometimes with short column-foot; anther operculate, often with horn-like apex; pollinia 2, with short or rudimentary stipe attached to large viscidium; stigma in cavity below rostellum. $x = 29$ (1 report).

Species 31, pantropical; 3 in KwaZulu-Natal.

Pachites Lindl. 1426000

(Orchidoideae—Diseae)

Lindley: 301 (1835); Rolfe: 177 (1912); Phillips: 232 (1951); Schelpe: 78 (1966); Stewart *et al.*: 180 (1982); Linder & Kurzweil: 150 (1999).

Terrestrial herbs up to 0.4 m tall, with root tubers. **Leaves** linear, cauline. **Inflorescence** a short raceme; bracts lanceolate; flowers not resupinate, almost regular, pink or purple. **Sepals** subequal, free, spreading. **Petals** similar to sepals but slightly smaller. **Lip** similar to sepals, simple or with minute basal side lobes, spurless. **Gynostemium** with elongate column-part; anther thecae pendent, anther canals absent; pollinia 2, sectile, attached to separate viscidia. **Capsule** cylindrical or ellipsoid.

Species 2, Western Cape, rare.

Platylepis A.Rich. 1516000

(Spiranthoideae—Cranichidae)

Richard: 34, t. 6 (1828) name conserved; Rolfe: 82 (1912); Phillips: 240 (1951); Schelpe: 54 (1966); Stewart *et al.*: 212 (1982); Linder & Kurzweil: 75 (1999).

Terrestrial herbs, with creeping rhizomes. **Leaves** petiolate, ovate or ovate-lanceolate. **Inflorescence** a few- to many-flowered raceme; flowers white, greenish or pinkish brown; bracts ovate, glandular hairy. **Sepals** subequal, free; laterals united at base into short chin. **Petals** narrow, partly cohering with median sepal to form hood. **Lip** partly adnate to gynostemium, saccate at base, with variously shaped calli. **Gynostemium** elongate, with erect anther as long as rostellum; pollinia 2, attached to single viscidium; stigmas broad, papillose. **Capsule** oblong, shortly contracted at apex.

Species ± 10, Africa and Mascarene Islands; 1 in sthn Afr.: *Platylepis glandulosa* (Lindl.) Rchb.f., KwaZulu-Natal north of Durban.

Polystachya Hook. 1565000

(Epidendroideae—Epidendreae)

Hooker: t. 103 (1825) name conserved; Rolfe: 63 (1912); Phillips: 241 (1951); Schelpe: 34 (1966); Harrison: 11 (1972); Stewart *et al.*: 222 (1982); Linder & Kurzweil: 407 (1999).

Epiphytic, rarely lithophytic herbs. **Stems** short, frequently pseudobulbous. **Leaves** 1–several, distichous, leathery, sheathing at base. **Inflorescences** terminal, racemes or panicles; flowers minute to fairly large, not resupinate, often pubescent, colours various; bracts small, lanceolate to ovate. **Sepals** connivent or spreading; median one free; laterals adnate to column-foot to form prominent mentum. **Petals** narrower than median sepal. **Lip** 3-lobed or entire, glabrous or pubescent, often with basal callus. **Gynostemium** short and broad, produced into column-foot at base; anther operculate; pollinia 2, waxy, attached by square to linear stipe to viscidium. **Capsule** oblong or fusiform, sometimes elongate. $x = 10$ (high polyploidy).

Species ± 200, predominantly African, but also found in Asian, Australasian and American tropics; 11 in northern and eastern parts of sthn Afr., from Northern Province to Swellendam (Western Cape).

Pterygodium Sw. 1438000

(Orchidoideae—Diseae)

Swartz: 217 (1800); Rolfe: 271 (1913); Phillips: 237 (1951); Schelpe: 102 (1966); Stewart *et al.*: 183 (1982); Kurzweil *et al.*: 215 (1991); Linder & Kurzweil: 327 (1999).

Ommatodium Lindl.: 365 (1838); Rolfe: 270 (1913); Phillips: 237 (1951). *Anochilus* (Schltr.) Rolfe in part; Rolfe: 280 (1913); Phillips: 238 (1951); Schelpe: 104 (1966); Stewart *et al.*: 189 (1982).

Terrestrial herbs, slender to robust, with small root tubers. **Leaves** cauline, few, elliptic to lanceolate. **Inflorescence** a lax raceme, sometimes fairly dense; flowers resupinate or rarely not resupinate, yellow, green or white; bracts ovate-lanceolate to lanceolate. **Sepals** free, spreading; median one concave and adnate to petals, forming a shallow hood; laterals spreading or reflexed. **Lip** basally fused to gynostemium, entire, 2- or 3-lobed; bearing variously shaped tall appendage near its base. **Gynostemium** short, dilated, structure very complicated; anther with 2 thecae which are separated by wide connective, erect or reflexed, anther canals absent or very short; pollinia 2, sectile, with separate viscidia at extremities of horizontal arms. **Capsule** cylindrical or obovoid, ribbed.

Species 18, widespread in sthn Afr., mainly in Western Cape and Drakensberg (KwaZulu-Natal); 1 only known from Tanzania.

Rangaeris (Schltr.) Summerh. 1830010

(Epidendroideae—Vandeae)

Summerhayes: 227 (1936); Summerhayes: 435 (1949); Harrison: 51 (1972); Stewart *et al.*: 265 (1982); Linder & Kurzweil: 444 (1999).

Epiphytic monopodial herbs, with short or long leafy stems, without pseudobulbs. **Leaves** leathery, ligulate to oblanceolate, deeply keeled, acute to unequally bilobed. **Inflorescences** few- to several-flowered racemes; flowers small or relatively large, usually white or yellowish. **Sepals** and **petals** subsimilar, free, spreading to recurved. **Lip** ovate to lanceolate, sometimes obscurely trilobed at base, with long spur. **Gynostemium** long or short, without column-foot; anther operculate, produced into broad obtuse beak; pollinia 2, pyriform, attached by 2 separate stipes to single large viscidium; rostellum bifid. **Capsule** fusiform, often rather elongate. $x = 23$ (polyploidy).

Species 6, tropical and subtropical Africa; 1 in Mpumalanga, KwaZulu-Natal, and Eastern Cape: *Rangaeris muscicola* (Rchb.f.) Summerh.

Satyrium Sw. 1430000

(Orchidoideae—Diseae)

Swartz: 214 (1800) name conserved; Rolfe: 145 (1912); Phillips: 233 (1951); Schelpe: 76 (1966); Hall: 5 (1982); Stewart *et al.*: 160 (1982); Linder & Kurzweil: 152 (1999).

Aviceps Lindl.: 345 (1838); Rolfe: 176 (1912); Phillips: 234 (1951). *Satyridium* Lindl.: 345 (1838); Rolfe: 144 (1912); Phillips: 233 (1951); Stewart *et al.*: 179 (1982).

Terrestrial herbs, with ovoid or globose tubers. **Leaves** 2–few, basal or cauline, sometimes flat on ground. **Inflorescence** a dense or lax raceme, many- or few-flowered, rarely subcapitate; flowers not resupinate; sepals and petals ± fused at base or in basal portion, to lesser extent also to lip, in various shades of red, white, orange and yellow; bracts membranous or fleshy, often reflexed. **Sepals** simple, subequal or laterals broader, spreading or reflexed. **Petals** simple, sometimes with fringed margins, similar to petals. **Lip** almost always galeate, apex developed as narrow, erect or reflexed 'flap', base with 2 descending spurs or sacs, rarely without. **Gynostemium** erect with elongate column-part; anther thecae pendent, parallel and adjacent, anther canals absent or short; pollinia 2, sectile, each with distinct caudicle, viscidia 2, sometimes connate, very rarely 1. **Capsule** elongate to ovoid, not twisted. $x = 41$ (polyploidy).

Species ± 88, Africa and Madagascar, extending to India, Myanmar (=Burma) and China; 37 in sthn Afr., widespread.

Schizochilus Sond. 1431000

(Orchidoideae—Orchideae)

Sonder: 78 (1847); Rolfe: 89 (1912); Phillips: 234 (1951); Schelpe: 62 (1966); Linder: 379 (1980); Stewart *et al.*: 75 (1982); Linder & Kurzweil: 87 (1999).

Terrestrial herbs, with ovoid or globose root tubers. **Leaves** usually grass-like, mainly radical, sometimes forming basal rosette, upper ones reduced to short sheathing bracts. **Inflorescence** a ± dense raceme, drooping; flowers not resupinate, yellow, pink or white. **Sepals** free, connivent or spreading, subequal. **Petals** simple, oblique, much smaller than sepals. **Lip** united with base of gynostemium, spurred, 3-lobed. **Gynostemium** short; anther thecae erect or slightly reflexed, parallel and adjacent, anther canals almost 0; pollinia 2, sectile, caudicles attached to separate viscidia; stigma concave at base of gynostemium; rostellum 3-lobed, central lobe small. **Capsule** oblong or ovoid.

Species 11, eastern and sthn Afr.; 8 in eastern half of sthn Afr., mainly in mountainous country.

Schizodium Lindl. 1432000

(Orchidoideae—Diseae)

Lindley: 358 (1838); Rolfe: 253 (1913); Phillips: 234 (1951); Schelpe: 94 (1966); Linder: 341 (1981b); Stewart *et al.*: 157 (1982); Linder & Kurzweil: 182 (1999).

Slender terrestrial herbs, with ovoid root tubers and wiry, flexuose stems. **Leaves** spathulate or elliptic-ovate, in radical tuft, green, often with purple dots. **Inflorescence** a short and lax raceme; flowers pink or white; bracts ovate-lanceolate. **Sepals** free; median one shallowly galeate and spurred; laterals spreading or reflexed. **Petals** basally ± fused with gynostemium, narrow and unequally bilobed at apex, with minute or prominent anticous lobe. **Lip** fiddle-shaped, unspurred; hypochile concave, mesochile wider and flat, epichile massive, linear, decurved process. **Gynostemium**: anther thecae short, reflexed, parallel and adjacent, anther canals insignificant; pollinia 2, sectile, attached by short caudicles to separate viscidia; stigma pad in front of gynostemium; rostellum shortly 3-lobed. **Capsule** ovate-oblong.

Species 6; Western Cape, extending into Northern and Eastern Cape.

Solenangis Schltr. 1828100

(Epidendroideae—Vandeae)

Schlechter: 133 (1918); Linder & Kurzweil: 445 (1999).

Epiphytic herbs, monopodial, without pseudobulbs, with elongate stems, with or rarely without leaves. **Leaves** distichous, articulated to persistent sheath. **Inflorescences** axillary, few- or several-flowered; flowers small to medium-sized, white, often with green or red tinge. **Sepals** and **petals** subequal, free. **Lip** entire or 3-lobed, ecallose, with conical, clavate or cylindrical spur. **Gynostemium** stout, without column-foot; anther operculate; pollinia 2, ovoid, with narrow stipe and a solitary, often large viscidium; rostellum short and 2-lobed.

Species 5, in tropical Africa, Madagascar and the Mascarene Islands; 1 reaches Zululand (KwaZulu-Natal): *Solenangis aphylla* (Thouars) Summerh.

Stenoglottis Lindl. 1407000

(Orchidoideae—Orchideae)

Lindley in Hooker: 209 (1836); Rolfe: 115 (1912); Phillips: 230 (1951); Schelpe: 70 (1966); Stewart *et al.*: 80 (1982); Stewart: 11 (1989); Linder & Kurzweil: 146 (1999).

Terrestrial, lithophytic or occasionally low-level epiphytic herbs, with many tuberous roots. **Leaves** radical, in rosette at base of stem, sometimes dark-spotted; frequently with crisped or undulate margins; glabrous. **Inflorescence** a terminal, lax or dense, many-flowered raceme, frequently subsecund; flowers pink or lilac, usually with purple markings; bracts small. **Sepals** subequal, unlobed; longer than petals. **Petals** slightly narrower than sepals, unlobed. **Lip** 3- or 5-lobed, unspurred or spurred, longer than sepals and petals. **Gynostemium**: very short and broad; anther thecae parallel, anther canals short or absent; pollinia 2, sectile, affixed by short caudicle to small oblong viscidia; stigmatic processes 2, clavate or capitate; rostellum 3-lobed, very short. **Capsule** oblong, erect. $x = 18$ (1 report).

Species 4, widespread in the eastern half of sthn Afr., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape; 1 extends northwards as far as Tanzania.

Tridactyle Schltr. 1828010

(Epidendroideae—Vandeae)

Schlechter: 601 (1914); Schelpe: 50 (1966); Harrison: 79 (1972); Stewart *et al.*: 272 (1982); Linder & Kurzweil: 446 (1999).

Angraecum in part; Rolfe: 68 (1912); Phillips: 243 (1951).

Epiphytic monopodial herbs, with short or elongate leafy stems, without pseudobulbs. **Leaves** distichous, terete or flat, linear to ligulate, tip often unequally bilobed. **Inflorescences** lateral, few- to many-flowered racemes; flowers cream to yellow or green; bracts small. **Sepals** and **petals** subsimilar, free, spreading or recurved. **Lip** usually tri-lobed, with lateral lobes often fimbriate or serrate, spurred at base. **Gynostemium** short and fleshy, lacking column-foot; anther horizontal or somewhat reclining, operculate; pollinia 2, attached by entire or Y-shaped stipe to circular or elliptic viscidium; rostellum elongate, tapering towards apex. **Capsule** mostly ellipsoid. $x = 23$ (aneuploids, polyploidy).

Species ± 42, sub-Saharan Africa; 4 south to Eastern Cape.

Vanilla Mill. 1480000

(Epidendroideae—Vanilleae)

Miller: [1432] (1754); Ward: 48 (1984); Linder & Kurzweil: 350 (1999).

Lianas, creeping in bushes and trees. **Stems** usually terete, occasionally succulent. **Leaves** cauline, spaced and oblong-elliptical to broadly ovate, rarely 0. **Inflorescences** short racemes, rarely branched, normally axillary, with few to many large flowers, white to green. **Sepals** and **petals** free, petals often keeled on dorsal surface. **Lip** funnel-shaped, usually with lamellae and hairs. **Gynostemium** elongate; anther operculate, in-

cumbent; stigma in cavity under rostellum. **Capsule** linear, often very long. $x = 16$ (aneuploids, polyploidy).

Species ± 100, throughout the tropics of the world; 1 in KwaZulu-Natal: *Vanilla roscheri* Rchb.f.

Ypsilopus Summerh. 1830030

(Epidendroideae—Vandeae)

Summerhayes: 439 (1949); Harrison: 98 (1972); Stewart *et al.*: 265 (1982); Linder & Kurzweil: 450 (1999).

Erect or pendent epiphytic monopodial herbs with short stems, without pseudobulbs. **Leaves** stiff, linear, arranged in two rows. **Inflorescences** lateral, laxly few- to many-flowered; flowers white or pale green; bracts amplexicaul, small. **Sepals** and **petals** free, subsimilar, spreading. **Lip** entire or obscurely 3-lobed, long-spurred at base. **Gynostemium** short, terete; anther operculate; pollinia 2, subglobose, stipe solitary, Y-shaped, viscidium large, reniform or oblong; rostellum 2-lobed.

Species 4, from East Africa to sthn Afr.; 1 in subtropical parts of KwaZulu-Natal and Eastern Cape: *Ypsilopus erectus* (P.J.Cribb) P.J.Cribb & J.L.Stewart.

Zeuxine Lindl. 1502000

(Spiranthoideae—Cranichidae)

Lindley: 9 (1826b); Rolfe: 81 (1912); Phillips: 239 (1951); Stewart *et al.*: 212 (1982); Linder & Kurzweil: 77 (1999).

Terrestrial herbs, slender, dwarf. **Leaves** linear or ovate, with broad sheathing base. **Inflorescences** dense or elongate spikes; flowers not resupinate, scarcely opening, white with yellow lip; bracts longer than flowers. **Sepals** subequal, median one erect, concave; laterals spreading, free. **Petals** narrow, often cohering with median sepal to form hood. **Lip** shortly adnate to base of gynostemium, concave or subsaccate at base, with or without pair of calli inside, ± contracted in middle, dilated at apex into entire or bilobed limb. **Gynostemium**: anther shortly apiculate; pollinia 2, with caudicle attached to broad, rounded viscidium; stigmas 2, lateral. **Capsule** small, erect, ovoid or subglobose. $x = 10$ (aneuploids, high polyploidy).

Species ± 76, in Old World tropics and subtropics; 1 in sthn Afr.: *Zeuxine africana* Rchb.f., Botswana, also near Durban (KwaZulu-Natal).

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Poaceae (Gramineae)

(Commelinidae—Cyperales / Poales)

Compiled by L. Fish

Annual or perennial herbs, rarely woody, very rarely tree-like, sometimes rhizomatous or stoloniferous, innovation shoots arising either intra- or extra-vaginally. **Culms** (stems) mostly annual, even in perennials; erect, ascending, prostrate, decumbent or creeping, sometimes rooting at nodes, or floating, simple or branched; in perennials sterile and flowering culms mixed, in annuals only flowering culms present; culm usually cylindrical, sometimes flattened, jointed; internodes hollow, sometimes solid, with a soft, meristematic zone above each node; nodes solid; 2-keeled, hyaline prophylls present at base. **Leaves** solitary, basal or cauline; alternate and 2-ranked, consisting of sheath, ligule and blade (lamina); *sheath* surrounding and supporting the culm, with margins free and overlapping or ± connate, with a meristematic zone at its base; *ligule* adaxial, situated at junction of blade and sheath, an unfringed or fringed membrane or fringe of hairs, rarely 0, or not present on all leaves, occasionally abaxial ligule also present, occasionally auricles present at base of blade or apex of sheath; *blade* usually long and narrow, rarely short and broad, flat, plicate, sometimes rolled, rolled inwards from one margin (convolute), rolled inwards from both margins (involute), or setaceous, occasionally blade consisting of midrib only, parallel-nerved, rarely with cross venation (transverse connections), usually passing gradually into sheath, sometimes amplexicaul or with sagittate base, rarely pseudopetiolate or articulated with sheath. **Inflorescence** usually terminal, rarely axillary, ranging from a single spike to several, variously arranged spike-like branches to many-branched, open or condensed panicles or sometimes gathered into a leafy false panicle; *spikelets*, the basic flowering units borne in the inflorescence, are solitary, paired or 3- or 4-nate or clustered, sessile or pedicelled, or unequally pedicelled, pairs may be in long-short combinations: one sessile and one pedicelled spikelet; spikelets similar or dissimilar in sexuality on same inflorescence. **Spikelets** typically consisting of a basal pair of subopposite empty bracts or *glumes* and 1 to several florets distichously arranged on an axis or rachilla and made up of several parts (basic pattern of spikelet structure consistent throughout family, though often with modification by reduction or suppression or elaboration of parts). **Florets** bisexual, unisexual or sterile, sometimes all mixed in the same spikelet, typically consisting of a subopposite pair of scale-like bracts: an outer (usually visible) *lemma* often produced into 1 or more awns or mucros; an inner *palea* usually more delicate than lemma; and a *callus* (horny prolongation) may occur at base of spikelet or lemma. **Lodicules** (tiny scales taken to represent vestigial perianth members) 2(0 or 3). **Stamens** 3(1–6 or more), hypogynous, with 2-thecous anthers opening by longitudinal slits or rarely a terminal pore. **Ovary** superior, 1-locular with a single anatropous (when mature) ovule, often adnate to adaxial side of carpel, and surmounted by 2(1 or 3) feathery stigmas. **Fruit** mostly a caryopsis with thin pericarp adnate to seed, sometimes pericarp free, sometimes an achene, nut or berry; caryopsis commonly combined with various parts of spikelet, or less often inflorescence, to form a false fruit.

Genera ± 688; species ± 9500; sthn Afr.: genera 194 (29 exotic), species 912. At present much work is being done on the higher classification of the grasses, and taxonomic understanding continues to improve. The system reflected in this work is based on that of Clayton & Renvoize (1986). The classification system of Watson & Dallwitz (1989, 1994) should also be consulted.

Chippindall: 11 (1955); Launert: 1 (1970a); Clayton: 1 (1970); Launert: 1 (1971); Clayton *et al.*: 177 (1974); Clayton & Renvoize: 451 (1982); Clayton & Renvoize: 1 (1986); Gibbs Russell *et al.*: 1 (1990); Watson & Dallwitz: (1994).

Synopsis of classification

The classification and sequence of subfamilies and tribes follow that of Clayton & Renvoize (1986), but only taxa relevant to sthn Afr. have been given:

I. Subfamily BAMBUSOIDEAE
   1. Tribe **Bambuseae**
      a) Subtribe **Arundiniinae**: *Thamnocalamus*
      b) Subtribe **Bambusinae**: **Bambusa*
      c) Subtribe **Melocanninae**: *Oxytenanthera*
   2. Tribe **Olyreae**: *Olyra*
   3. Tribe **Oryzeae**: *Leersia*, *Oryza*, *Prosphytochloa*
   4. Tribe **Ehrharteae**: *Ehrharta*, **Microlaena*

II. Subfamily POOIDEAE
1. Tribe **Stipeae**: **Nassella*, *Stipa*
2. Tribe **Poeae**: **Briza*, **Catapodium*, *Colpodium*, **Cynosurus*, **Dactylis*, *Festuca*, **Lamarckia*, **Lolium*, *Poa*, *Puccinellia*, **Sphenopus*, **Vulpia*
3. Tribe **Hainardieae**: **Hainardia*, **Parapholis*
4. Tribe **Meliceae**: *Melica*, *Streblochaete*
5. Tribe **Aveneae**
   a) Subtribe **Aveninae**: **Aira*, **Arrhenatherum*, **Avena*, **Corynephorus*, **Deschampsia*, *Helictotrichon*, *Holcus*, *Koeleria*, **Lophochloa*, **Periballia*, **Phalaris*
   b) Subtribe **Phalaridinae**: *Anthoxanthum*
   c) Subtribe **Alopecurinae**: *Agrostis*, **Ammophila*, *Calamagrostis*, **Gastridium*, **Lagurus*, *Polypogon*
6. Tribe **Bromeae**: *Bromus*
7. Tribe **Triticeae**: *Brachypodium*, **Elytrigia*, *Hordeum*, *Secale*, *Thinopyrum*

III. Subfamily CENTOTHECOIDEAE
1. Tribe **Centotheceae**: *Megastachya*

IV. Subfamily ARUNDINOIDEAE
1. Tribe **Arundineae**: **Arundo*, *Centropodia*, *Chaetobromus*, **Cortaderia*, *Dregeochloa*, *Elytrophorus*, *Karroochloa*, *Merxmuellera*, *Pentameris*, *Pentaschistis*, *Phragmites*, *Prionanthium*, *Pseudopentameris*, *Schismus*, *Styppeiochloa*, *Tribolium*
2. Tribe **Aristideae**: *Aristida*, *Sartidia*, *Stipagrostis*

V. Subfamily CHLORIDOIDEAE
1. Tribe **Pappophoreae**: *Enneapogon*, *Kaokochloa*, *Schmidtia*
2. Tribe **Eragrostideae**
   a) Subtribe **Uniolinae**: *Entoplocamia*, *Fingerhuthia*, *Tetrachne*
   b) Subtribe **Eleusininae**: *Acrachne*, *Bewsia*, *Brachychloa*, *Cladoraphis*, *Coelachyrum*, *Dactyloctenium*, *Diandrochloa*, *Dinebra*, *Eleusine*, *Eragrostis*, *Leptocarydion*, *Leptochloa*, *Lophacme*, *Odyssea*, *Oropetium*, *Pogonarthria*, *Trichoneura*, *Tripogon*, *Triraphis*
   c) Subtribe **Sporobolinae**: *Sporobolus*
3. Tribe **Leptureae**: *Lepturus*
4. Tribe **Cynodonteae**
   a) Subtribe **Pommereullinae**: *Lintonia*
   b) Subtribe **Chloridinae**: *Brachyachne*, *Chloris*, *Craspedorhachis*, *Ctenium*, *Cynodon*, *Enteropogon*, *Eustachys*, *Harpochloa*, *Microchloa*, *Polevansia*, *Rendlia*, *Schoenefeldia*, *Spartina*, *Tetrapogon*, *Willkommia*
   c) Subtribe **Zoysiinae**: *Catalepis*, *Monelytrum*, *Mosdenia*, *Perotis*, *Tragus*

VI. Subfamily PANICOIDEAE
1. Tribe **Paniceae**
   a) Subtribe **Setariinae**: *Acroceras*, *Alloteropsis*, **Axonopus*, *Brachiaria*, *Echinochloa*, *Entolasia*, *Eriochloa*, *Leucophrys*, *Oplismenus*, *Oryzidium*, *Panicum*, *Paspalidium*, *Paspalum*, *Pseudechinolaena*, *Sacciolepis*, *Setaria*, *Stenotaphrum*, *Urochloa*
   b) Subtribe **Melinidinae**: *Melinis*, *Tricholaena*
   c) Subtribe **Digitariinae**: *Digitaria*, *Megaloprotachne*, *Stereochlaena*, *Tarigidia*
   d) Subtribe **Cenchrinae**: *Anthephora*, *Cenchrus*, *Odontelytrum*, *Paratheria*, *Pennisetum*
2. Tribe **Arundinelleae**: *Arundinella*, *Danthoniopsis*, *Loudetia*, *Trichopteryx*, *Tristachya*
3. Tribe **Andropogoneae**
   a) Subtribe **Saccharinae**: *Eriochrysis*, *Eulalia*, *Imperata*, *Microstegium*, *Miscanthus*
   b) Subtribe **Germainiinae**: *Trachypogon*
   c) Subtribe **Sorghinae**: *Bothriochloa*, *Chrysopogon*, *Cleistachne*, *Dichanthium*, *Sorghastrum*, *Sorghum*, *Vetiveria*
   d) Subtribe **Ischaeminae**: *Ischaemum*, *Sehima*, *Thelepogon*
   e) Subtribe **Andropogoninae**: *Audropogon*, *Arthraxon*, *Cymbopogon*, *Diheteropogon*, *Schizachyrium*
   f) Subtribe **Anthistiriinae**: *Elymandra*, *Heteropogon*, *Hyparrhenia*, *Hyperthelia*, *Monocymbium*, *Themeda*
   g) Subtribe **Rottboelliinae**: *Coelorachis*, *Elionurus*, *Hackelochloa*, *Hemarthria*, *Oxyrhachis*, *Phacelurus*, *Rhytachne*, *Rottboellia*, *Urelytrum*, *Vossia*
   h) Subtribe **Coicinae**: **Coix*

Key to keys

1a Culms woody: bamboos; leaf lamina usually constricted into a pseudo-petiole; flowering erratically (if spikelets unisexual see *Olyra*) ..... Key 1 (p. 661)

1b Culms usually herbaceous; leaf lamina usually not constricted at base into a pseudo-petiole; flowering annually (if perennial, rhizomatous, lawn-forming and inflorescence inconspicuous, enclosed in upper leaf sheath, and of 2–4 spikelets and only anthers and stigmas long-exserted, see *Pennisetum clandestinum*):

2a Inflorescence a complex leafy false panicle, spikelet-bearing axis (usually a short raceme) either single or paired, these closely to sparsely subtended by spathes and spatheoles ..... Key 2 (p. 661)

2b Inflorescence leafless, spikelet-bearing axis not closely subtended by spathes or spatheoles (sometimes closely associated with uppermost leaf):

3a Inflorescence of either paired or of 3 to many digitately or subdigitately arranged branches at apex of culm, sometimes enclosed by uppermost leaf at some stage of development; if in false leafy panicles, then spikelet-bearing axis not obviously or closely associated with leaf-like spathes ..... Key 3 (p. 662)

3b Inflorescence not branched, or with spikelet-bearing branches not largely confined to apex of flowering culm:

4a Inflorescence a true spike or spike-like (spikelets or inflorescence branches being so closely packed against the axis to appear like a spike), linear to globose in shape, occasionally spikelet solitary on culm ..... Key 4 (p. 664)

4b Inflorescence an open or contracted panicle or raceme or with spike-like primary branches scattered up elongated central axis ..... Key 5 (p. 671)

Key 1 (*Woody bamboos*)

1a Leaf blade strongly cross-veined, forming a tesselate pattern; spikelets not in globose clusters; stamens 3 ..... **Thamnocalamus**

1b Leaf blade not strongly cross-veined; spikelets in globose clusters; stamens 6:

2a Culm sheath blade very broad ..... ***Bambusa**

2b Culm sheath blade narrow ..... **Oxytenanthera**

Key 2 (*Inflorescence a complex, leafy, false panicle*)

1a Inflorescence branches each subtended by a smooth ivory-like bead or cupule enclosing female spikelets; male spikelets on a tassel exserted from bead; annuals ..... ***Coix**

1b Inflorescence branches not subtended by a smooth ivory-like bead or cupule; annuals or perennials:

2a Spikelet subtended by a bristle ..... **Pennisetum**

2b Spikelet not subtended by a bristle:

3a Upper lemma of sessile spikelet awnless:

4a Pedicel of pedicelled spikelet free from rachis:

5a Keels of lower glume of sessile spikelet winged; inflorescence rachis joints transverse, internodes clavate; sessile spikelet 4.5–5.0 mm long ..... **Coelorachis**

5b Keels of lower glume of sessile spikelet not winged, (usually with a thick oil streak); inflorescence rachis joints oblique, internodes columnar to subclavate; sessile spikelet 5–15 mm long ..... **Elionurus**

4b Pedicel of pedicelled spikelet usually discernible but fused with rachis and appearing sessile:

6a Sessile spikelet globose; lower glume conspicuously pitted or tuberculate; raceme internodes oblong..... ..... **Hackelochloa**

6b Sessile spikelet elliptic to lanceolate; lower glume smooth; raceme internodes clavate or flattened to semicylindrical:

7a Racemes dorsally compressed, resembling the culm, tough; plants perennial, decumbent or rambling; basal sheaths without irritant hairs; spikelets of a pair similar, especially in sexuality ..... **Hemarthria**

7b Racemes cylindrical, fragile; robust annuals, erect; basal sheaths with irritant hairs; spikelets of a pair very dissimilar, especially in sexuality ..... **Rottboellia**

3b Upper lemma of sessile spikelet awned or mucronate (sometimes minutely so):

8a Spikelets clustered into triangular units resembling a single spikelet, each unit usually 1-awned, rarely 2- or 3-awned, composed of a single, awned, sessile, bisexual spikelet and two pedicelled spikelets, enclosed by an involucre of 4 sterile sessile spikelets ..... **Themeda**

8b Spikelets not in triangular units resembling a single spikelet:

9a Racemes solitary in spathcoles·

10a Ligule an unfringed membrane; spatheole boat-shaped, distinct and closely associated with spikelet-bearing axis; sessile spikelet 3.5–4.0 mm long ..... **Monocymbium**

10b Ligule a fringed membrane or a fringe of hairs; spatheole not boat-shaped, closely or not closely associated with spikelet-bearing axis; sessile spikelet 4–20 mm long (rarely 2–3 mm long):

11a Pedicelled spikelet smaller than sessile spikelet ..... **Schizachyrium**

11b Pedicelled spikelet larger than sessile spikelet:

12a Lower glume of sessile spikelet deeply and narrowly grooved; inflorescence awned all the way; at least one glume per spikelet in pair long-awned ..... **Andropogon**

12b Lower glume of sessile spikelet flat or rounded on back; inflorescence awned only in upper part; glumes of both spikelets in pair awnless ..... **Heteropogon**

9b Racemes 2 or more in spatheoles:

13a Inflorescence without conspicuous spathes and spatheoles subtending spikelet-bearing axis (low down on flowering culm(s) and closely appressed to inflorescence rachis):

14a Callus of sessile spikelet long, acute to pungent ..... **Diheteropogon**
14b Callus of sessile spikelet short, obtuse or rounded:
15a Pedicel and internodes longitudinally grooved with a translucent median line ..... **Bothriochloa**
15b Pedicel and internodes without a translucent median line:
16a Upper lemma of sessile spikelet 2-lobed, awn from between lobes; internodes of rachis ± cup-shaped on top ..... **Andropogon**
16b Upper lemma of sessile spikelet entire, apex gradually passing into awn; internodes of rachis not cup-shaped ..... **Dichanthium**
13b Inflorescence with conspicuous spathes and spatheoles subtending spikelet-bearing axis:
17a Awn of upper lemma of sessile spikelet glabrous; plants usually aromatic ..... **Cymbopogon**
17b Awn of upper lemma of sessile spikelet distinctly hairy; plants not aromatic:
18a Lower glume of sessile spikelet flattened to rounded on back; upper glume of sessile spikelet obtuse to acute or mucronate; pedicelled spikelet 3–8(–10) mm long ..... **Hyparrhenia**
18b Lower glume of sessile spikelet with a shallow median groove; upper glume of sessile spikelet acute to apiculate or shortly awned; pedicelled spikelet 9–14 mm long ..... **Hyperthelia**

Key 3 (*Inflorescence paired, digitate or subdigitate*)

1a Spikelets in triads with pedicels fused, the whole mimicking a single spikelet ..... **Tristachya**
1b Spikelets solitary or 2- to many-nate, pedicels not fused to resemble a single spikelet (one spikelet of a pair may be missing and only represented by an empty pedicel):
2a Spikelets 2–many-nate (at point of attachment to rachis): (2b on p. 663)
3a Spikelets all similar; upper lemma usually similar to firmer in texture than glumes; spikelets sessile, subsessile or equally or unequally pedicelled:
4a Spikelet awnless (glume or lemma sometimes long-acuminate and appearing awned):
5a Upper lemma with narrow, inrolled margins clasping only edges of palea (Paspalum-type) ..... **Paspalum**
5b Upper lemma with flat, thin margins covering most of the palea and often overlapping (Digitaria-type):
6a Lower glume as long as to slightly longer than spikelet ..... **Megaloprotachne**
6b Lower glume shorter than spikelet or suppressed ..... **Digitaria**
4b Spikelet awned or mucronate (sometimes minutely so):
7a Florets 2 per spikelet, lower sterile or male, upper bisexual; spikelet dorsiventrally compressed, falling with glumes:
8a Lower glume well developed; upper glume as long as lemma; lower lemma awnless; upper lemma awned, awn robust, shorter than spikelet ..... **Alloteropsis**
8b Lower glume absent, upper glume a minute scale; lower lemma awned, awn fine, longer than spikelet; upper lemma awnless ..... **Stereochlaena**
7b Florets 2 or more per spikelet, lower floret(s) bisexual; spikelet laterally compressed, disarticulating above glumes:
9a Glumes very unequal in size; bisexual floret 1, rarely 2 per spikelet, rest reduced or sterile ..... **Chloris**
9b Glumes ± equal in size; bisexual florets 2–7 per spikelet, upper reduced or sterile ..... **Tetrapogon**
3b Spikelet pairs usually dissimilar; if similar, then upper lemma of bisexual spikelet less firm in texture than glumes; 1 spikelet usually sessile or subsessile, the other pedicelled (long-short combination), sometimes pedicel without spikelet:
10a Internodes of rachis and pedicels stout, 3-angled, rounded or flattened and thickened upwards; upper lemma of bisexual spikelet (usually sessile spikelet) awnless:
11a Lower glume of sessile spikelet produced into long awn-like flattened tail; sessile spikelet 20–40 mm long; ligule a fringed membrane ..... **Vossia**
11b Lower glume of sessile spikelet without a long herbaceous tail; sessile spikelet 6–8 mm long; ligule an unfringed membrane:
12a Pedicelled spikelet long-awned (5–120 mm) from lower glume ..... **Urelytrum**
12b Pedicelled spikelet awnless; lower glume of sessile spikelet strongly ridged due to prominent nerves ..... **Phacelurus**
10b Internodes of rachis and pedicels slender, filiform or linear, sometimes thickened upwards, clavate or substantial, but then upper lemma of bisexual spikelet (usually sessile spikelet) awned:
13a Pedicelled spikelet absent, represented only by a flattened, linear pedicel; glumes rugose; coarse annuals; leaf base amplexicaul ..... **Thelepogon**
13b Pedicelled spikelet present; glumes rugose or not; annuals or perennials; leaf base amplexicaul or not:
14a Spikelets unequally pedicelled; subsessile spikelet male or sterile, awnless, long-pedicelled spikelet bisexual, awned ..... **Trachypogon**
14b Spikelets usually 1 sessile and the other pedicelled, with only the sessile spikelet or both spikelets bisexual, awned or awnless:
15a Both spikelets of a pair with at least one lemma with large awn:
16a Spikelet-bearing rachis substantial, clavate or inflated, often appearing U- or V-shaped from the back; sessile or subsessile spikelet with lower palea well developed ..... **Ischaemum**
16b Spikelet-bearing rachis slender; sessile spikelet with lower palea absent or reduced:
17a Lower glume shallowly concave to medianly grooved; spikelets and pedicels glabrous or sparsely hairy; inflorescence open with spikelets loosely spaced; plants rambling or creeping ..... **Microstegium**
17b Lower glume concave to ± flat; spikelets and pedicels hairy; inflorescence dense with spikelets closely spaced; plants tufted ..... **Eulalia**

15b Usually only sessile spikelet of a pair with at least one lemma with large awn:
18a Upper lemma of sessile spikelet entire, gradually passing into awn; callus of sessile spikelet not inserted into hollowed top of internode:
19a Lower glume of sessile spikelet acute to subacute; pedicels and internodes longitudinally grooved with a translucent median line ..... **Bothriochloa**
19b Lower glume of sessile spikelet obtuse to truncate; pedicels and internodes not grooved, without a translucent median line ..... **Dichanthium**
18b Upper lemma of sessile spikelet lobed, awned from between lobes or low down on back; callus of sessile spikelet inserted into hollowed top of internode (if not clear, then pedicels and internodes inflated):
20a Palea of lower floret of sessile or subsessile spikelet well developed; inflorescence axis usually appears U- or V-shaped from the back ..... **Ischaemum**
20b Palea absent in lower floret of sessile spikelet; inflorescence axis not U- or V-shaped from the back:
21a Callus long, acute to pungent ..... **Diheteropogon**
21b Callus often short, obtuse to truncate:
22a Upper lemma of sessile spikelet awned from between bilobed apex; lower glume of sessile spikelet not spinously muricate; leaf base not markedly cordate; callus obtuse ..... **Andropogon**
22b Upper lemma of sessile spikelet awned from low down on back; lower glume of sessile spikelet spinously muricate; leaf base markedly cordate; callus truncate ..... **Arthraxon**

2b Spikelets solitary (at point of attachment to rachis):
23a Inflorescence branches not obviously secund:
24a Ligule an unfringed membrane; lemma 5–9-nerved, usually with a short stout awn; florets all similar in shape; hairs on lemma clavate and apiculate ..... **Lintonia**
24b Ligule a fringed membrane; lemma 3-nerved, awn slender; upper sterile florets modified to form a tuft of awns; hairs on lemma not clavate ..... **Lophacme**
23b Inflorescence branches obviously secund:
25a Each inflorescence spike ending in a rigid, naked point ..... **Dactyloctenium**
25b Each inflorescence spike not ending in a naked point:
26a Florets strictly 1 per spikelet, occasionally with a rachilla extension, rarely a vestigial floret present (if lower glume & palea missing and upper glume & lower lemma similar see *Axonopus* and *Paspalum*):
27a Lemma awned; awn long and flexuous, becoming entangled with awns of other spikelets ..... **Schoenefeldia**
27b Lemma awnless or mucronate:
28a Spikelet 12–15 mm long; glumes very unequal ..... **Spartina**
28b Spikelet 2.5–5.0 mm long; glumes ± equal to unequal:
29a Glumes shorter than spikelet, rarely as long, but then not enclosing floret ..... **Cynodon**
29b Glumes enclosing spikelet; floret not visible:
30a Spikelet laterally compressed; lower glume symmetrical in shape, both glumes medially keeled; inflorescence branches two ..... **Brachyachne**
30b Spikelet dorsiventrally compressed; lower glume asymmetrically 1-keeled, upper flat on back, 2-keeled; inflorescence branches several ..... **Craspedorhachis**
26b Florets 2 or more per spikelet, florets all fertile or mixed, some fertile and others male, sterile or reduced:
31a Lemma(s) of bisexual floret(s) awnless, sometimes mucronate:
32a Spikelet with 3–15 florets; lemmas similar, sometimes uppermost reduced ..... **Eleusine**
32b Spikelet with 2 florets; lemmas usually dissimilar, rarely 3 florets present, but then second floret male:
33a Lower floret male or reduced, upper floret bisexual (lower glume and lower palea absent, upper glume and lower lemma looking similar):
34a Upper lemma with flat, thin margins covering most of the palea and often overlapping (Digitaria-type); lower palea present ..... **Megaloprotachne**
34b Upper lemma with narrow, inrolled margins clasping only edges of palea (Paspalum-type); lower palea absent:
35a Spikelet abaxial (lower glume turned away from rachis, upper glume and lemma facing rachis)..... **Paspalum**
35b Spikelet adaxial (upper glume and lemma turned away from rachis) ..... **Axonopus**
33b Lower floret bisexual, upper sterile, reduced or vestigial:
36a Upper glume distinctly awned; spikelets golden to dark brown; sheaths strongly flabellate ..... **Eustachys**
36b Upper glume awnless; spikelets not golden or dark brown; sheaths not strongly flabellate ..... **Cynodon**
31b Lemma(s) of bisexual floret(s) awned, awn sometimes minute:
37a Lemma rounded or flat on back:
38a Spikelet laterally compressed, 6–10 mm long; lemma with short, sharp-pointed to obtuse or club-shaped hairs ..... **Lintonia**
38b Spikelet dorsiventrally compressed, 3–5 mm long; lemma glabrous ..... **Enteropogon**
37b Lemma keeled:
39a Glumes unequal in size:
40a Upper glume awned, awn up to half as long as body of glume ..... **Eustachys**
40b Upper glume awnless or with an awn point:
41a Lemma of bisexual floret similar to firmer in texture than glumes ..... **Chloris**
41b Lemma of bisexual floret less firm in texture than glumes ..... **Lophacme**

39b Glumes ± equal in size (excluding awn):
42a Lemma hairy, awn 3–11 mm long; spikelet cuneate; glumes nearly to as long as spikelet; hairy callus present ..... **Tetrapogon**
42b Lemma glabrous, awn 0.3–0.9 mm long; spikelet oblong with serrated outline; glumes much shorter than spikelet; callus absent ..... **Acrachne**

Key 4 (*Inflorescence a spike or spike-like*)

1a Spikelets solitary on flowering culm:
2a Florets 5–22 per spikelet, all florets bisexual, or uppermost sterile or reduced ..... **Brachypodium**
2b Florets 3 per spikelet, lower 2 sterile and reduced to lemmas, upper bisexual ..... **Ehrharta**
1b Spikelets many on flowering culm:
3a Spikelet or clusters of spikelets enlosed in an involucre of bracts or subtended by 1 to many bristles, spines, scales or bracts, bristle may be solitary, not obvious or hardened to form rigid spines, or inflorescence enclosed by a specialised inflated flag leaf, and the whole falling as a unit:
4a Inflorescence enclosed by inflated flag leaf, disarticulating below flag leaf and falling as one unit; glumes and lemmas long-awned; 3–7 florets per spikelet ..... **Tribolium**
4b Spikelet(s) enclosed by an involucre of bracts or a cupule of spines, or subtented by one to many bristles, scales or spines; florets 1 or 2 per spikelet:
5a Bristle(s) persisting on axis after spikelet(s) falls ..... **Setaria**
5b Bristle(s), scales, bracts or herbaceous cupule falling with spikelet(s):
6a Involucre of several sterile spikelets or coriaceous bracts; bristles absent ..... **Anthephora**
6b Involucre of one to many bristles, spines or herbaceous cupules or scales:
7a Involucral bristle, scale or cupule solitary:
8a Spikelet subtended by a herbaceous, lobed cupule or scale, one lobe longer and awn-like; stipe supporting spikelet blunt ..... **Odontelytrum**
8b Spikelet subtended by a solitary robust and awn-like or slender bristle; stipe supporting spikelet pungent or absent:
9a Spikelet subtended by a long, pungent stipe; bristle robust and awn-like ..... **Paratheria**
9b Spikelet sessile, not subtended by a stipe; bristle slender ..... **Pennisetum**
7b Involucral bristles or spines several to many:
10a Bristles free throughout, ± filiform ..... **Pennisetum**
10b Bristles connate and flattened below, forming a disc, sometimes flattened and/or hardened, forming rigid spines enclosing the spikelet ..... **Cenchrus**
3b Spikelets not enclosed by an involucre of bracts nor subtended by a bristle or bristles, if enclosed in flag leaf this not specialised and inflorescence not falling as a unit, sometimes enclosed by chaffy and/or enlarged glumes or spathes:
11a Inflorescence obviously 1-sided (secund) to subsecund: (11b on p. 665)
12a Spikelet awnless or mucronate:
13a Spikelet with 2 florets, lower male or sterile, upper bisexual (lower glume may be minute or absent, upper glume and lower lemma may resemble each other):
14a Central inflorescence axis thickened; racemes very short (sometimes a single spikelet), embedded in distinct cavities, central axis ending in a subulate tip and without spikelets ..... **Stenotaphrum**
14b Central inflorescence axis not thickened; spikelets or racemes free or in slight cavities:
15a Inflorescence of obvious short racemes scattered singly on alternate sides and appressed to long central axis ..... **Paspalidium**
15b Inflorescence with spikelets solitary, in pairs or triads densely packed on single raceme:
16a Upper lemma of spikelet with flat, hyaline margins enfolding and enclosing most of palea ..... **Digitaria**
16b Upper lemma of spikelet with narrow inrolled margins clasping only edges of palea ..... **Paspalum**
13b Spikelet with 1–many florets, all bisexual or upper male or sterile, or florets 3 with lower 2 sterile and upper bisexual, or if florets 2, then lowest bisexual:
17a Glumes unequal in size:
18a Upper glume 1-nerved; floret 1 per spikelet, falling with glumes ..... **Catalepis**
18b Upper glume 3–7-nerved; florets 2–5(–10) per spikelet, disarticulating above glumes:
19a Florets 3, lower 2 sterile, reduced to lemmas ..... **Ehrharta**
19b Florets 2–many, lowest bisexual, upper sometimes reduced:
20a Glumes similar in appearance and/or texture; lemma 5–9-nerved ..... **Tribolium**
20b Glumes dissimilar in appearance and/or texture; lemma 3-nerved ..... **Harpochloa**
17b Glumes ± equal in size:
21a Ligule an unfringed membrane:
22a Florets 3 per spikelet, lower 2 sterile, upper bisexual, usually smaller than lower 2; lower glume 5-nerved ..... **Ehrharta**
22b Florets 3–10 per spikelet, all bisexual except uppermost reduced and sterile; lower glume 1–3-nerved... ..... ***Catapodium**
21b Ligule a fringed membrane (fringe sometimes minute) or a fringe of hairs:
23a Floret 1 per spikelet:
24a Spikelet dark, usually brown or purple, not noticeably to dorsiventrally compressed; lemma 2-nerved ..... **Microchloa**
24b Spikelet light-coloured, golden brown, strongly laterally compressed; lemma 3-nerved ..... **Brachyachne**

23b Florets 2 or more per spikelet:
25a Florets 4–10 per spikelet ..... **Tribolium**
25b Florets 2 or 3 per spikelet:
26a Florets 3 per spikelet, lower 2 sterile, usually dissimilar from upper bisexual floret ..... **Ehrharta**
26b Florets 2 per spikelet, lower bisexual, upper bisexual or sterile:
27a Annuals; spikelet laterally compressed; glumes 5–8-nerved ..... **Prionanthium**
27b Perennials; lower glume obliquely compressed, upper glume dorsiventrally compressed; glumes 1-nerved ..... **Rendlia**

12b Spikelets, at least some, awned:
28a Ligule an unfringed membrane; spikelets dissimilar, bisexual ones mixed with sterile or male ones on same inflorescence:
29a Inflorescence soft and silky; spikelet cluster of 2 or 5 sterile spikelets with a terminal bisexual spikelet, clusters fall as a whole; bisexual spikelet with one fertile and one sterile floret; male or sterile spikelets with awnless lemmas ..... ***Lamarckia**
29b Inflorescence appearing bristly; spikelet cluster of 1 or more sterile spikelets mixed with bisexual spikelets consisting of (1)2 or 3 florets, clusters do not fall as a whole, spikelets disarticulating above glumes; sterile spikelets with glumes and lemma bearing long rigid awns ..... ***Cynosurus**
28b Ligule a fringe of hairs or a fringed membrane, (fringe sometimes minute); spikelets all similar in sexuality on inflorescence:
30a Upper glume with an oblique dorsal awn well below apex, 2- or 3-nerved, nerves with tubercles; lower 2 florets male or sterile ..... **Ctenium**
30b Upper glume awned from near apex or awnless, 1-nerved or 5–7-nerved, nerves not tubercled; lower florets bisexual, upper floret usually reduced and sterile:
31a Glumes ± equal in size; spikelet cuneate ..... **Tetrapogon**
31b Glumes unequal in size; spikelet elliptic-oblong to lanceolate or linear-elliptic:
32a Spikelet dorsiventrally compressed; inflorescence secund; tall robust plants usually 500 mm high or higher ..... **Enteropogon**
32b Spikelet laterally compressed; inflorescence subsecund; slender plants up to 220 mm high ..... **Tripogon**

11b Inflorescence not obviously secund; spikelets sometimes distichous: (11a on p. 664)
33a Ligule absent from upper or all leaves:
34a Spikelets densely and irregularly crowded on inflorescence; spikelet softly long-hairy ..... **Brachiaria**
34b Spikelets in regular rows on inflorescence; spikelet minutely soft-hairy or with long, rigid hairs ..... **Echinochloa**
33b Ligule present on all leaves:
35a Bisexual spikelet with 1 floret (rachilla extension sometimes present): (35b on p. 666)
36a Ligule an unfringed membrane:
37a Some or all spikelets awned:
38a Spikelets in triads, central spikelet bisexual, two lateral spikelets male or sterile; central spikelet with one floret, rachilla extension present; glumes side by side ..... **Hordeum**
38b Spikelets not in triads, or if in triads then all spikelets alike in function; glumes not displaced:
39a Glumes swollen and rounded on back near base ..... ***Gastridium**
39b Glumes not swollen or rounded on back:
40a Spikelets falling entire with the glumes:
41a Inflorescence a contracted panicle; lemma 5-nerved ..... **Polypogon**
41b Inflorescence a cylindrical spike or spike-like raceme; lemma 1-nerved ..... **Perotis**
40b Spikelets disarticulating above the glumes:
42a Glumes plumose with long silky hairs; inflorescence globose to ovoid ..... ***Lagarus**
42b Glumes glabrous or hairy, not plumose with long silky hairs; inflorescence linear:
43a Lemma awn very long and extending beyond glumes, awn apical or from sinus; lemma becoming indurated ..... **Stipa**
43b Lemma awn short, not extending beyond glumes, awned from well below apex or at base; lemma not becoming indurated:
44a Callus glabrous or with hairs up to half as long as lemma; spikelet up to ± 5 mm long... **Agrostis**
44b Callus beaded with long white hairs as long as to longer than lemma; spikelet 5.5–8.0 mm long ..... **Calamagrostis**
37b All spikelets awnless or mucronate:
45a Glumes longer than 10 mm ..... ***Ammophila**
45b Glumes 1–8 mm long:
46a Inflorescence with spikelets alternating on opposite sides and sunk in rachis; annuals:
47a Glumes 1, lower suppressed (terminal spikelets with 2) ..... ***Hainardia**
47b Glumes 2 but displaced, side by side ..... ***Parapholis**
46b Inflorescence with many spikelets all around, not sunk into rachis; perennials, sometimes annuals:
48a Inflorescence a contracted panicle; spikelet pedicelled, disarticulating above glumes; glumes similar in shape and/or texture; lemma 3–5-nerved ..... **Agrostis**
48b Inflorescence a dense spike; spikelet sessile, falling with glumes; glumes very dissimilar in shape and/or texture, upper glume flat-backed; lemma 1–3-nerved ..... **Mosdenia**
36b Ligule a fringed membrane or a fringe of hairs:
49a Spikelet awned or mucronate (sometimes minute):

50a Lemma 1–3-awned:
51a Lemma 1-awned:
52a Lower glume a minute membranous scale; lemma less firm in texture than glumes ..... **Monelytrum**
52b Lower glume well developed; lemma firmer in texture than glumes, usually becoming indurated:
53a Ligule a fringed membrane; lemma articulation never present ..... **Stipa**
53b Ligule a dense fringe of hairs; lemma articulation usually present (absent in *Aristida transvaalensis*):
54a Base of column with a pencil of long white hairs; callus pungent ..... **Stipagrostis**
54b Base of column glabrous; callus obtuse to truncate to rounded ..... **Aristida**
51b Lemma 3-awned (due to fusion of the lower parts of the awns into a column; it may be seen as one awn with 3 branches):
55a Lemma distinctly 2-lobed, lobes awned with long straight awns; central awn geniculate ..... ***Lagarus**
55b Lemma not appearing lobed, awns coming off ± together at apex, similar though lateral awns may be shorter; column present or absent:
56a Lemma awns all or only centre awn plumose; palea indurated ..... **Stipagrostis**
56b Lemma awns all glabrous, smooth or scabrid; palea not indurated:
57a Upper glume 3–5-nerved; lower glume usually 3-nerved; glumes rounded on back; awns spirally contorted at base; caryopsis deeply grooved ventrally ..... **Sartidia**
57b Upper glume 1(3)-nerved; lower glume nearly always 1-nerved; glumes 1-keeled to middle or below; awns not spirally contorted at base; caryopsis not deeply grooved ..... **Aristida**
50b Lemma mucronate or muticous:
58a Spikelets ± embedded on central axis:
59a Plant stoloniferous; leaves mainly cauline; spikelet dorsiventrally compressed, 8–22 mm long; upper glume awned ..... **Lepturus**
59b Plant densely tufted, not stoloniferous; leaves mainly basal; spikelet laterally compressed, 2.5–4.5 mm long; upper glume awnless ..... **Oropetium**
58b Spikelets not embedded on central axis (sometimes appressed):
60a Glumes awnless; inflorescence oblong; spikelet disarticulating above glumes ..... **Polevansia**
60b Glumes (or at least one) awned; inflorescence linear; spikelet disarticulating with glumes ..... **Perotis**
49b Spikelet neither awned nor mucronate:
61a Upper glume with large, hooked, curved or straight prickles, 5–7-nerved; spikelets dorsiventrally compressed; lower glume absent or a minute scale ..... **Tragus**
61b Upper glume without hooked, curved or long, straight prickles, 1-nerved; spikelet laterally to not noticeably compressed; lower glume substantial or reduced to a scale:
62a Lower glume substantial; lemma glabrous ..... **Sporobolus**
62b Lower glume small or reduced to a linear scale; lemma hairy, hairs in tufts or lines on either side of keel ..... **Catalepis**
35b Bisexual spikelet with 2–many florets (some florets may be reduced to lemmas or differ in size and shape): (35a on p. 665)
63a Ligule an unfringed membrane: (63b on p. 668)
64a Spikelets viviparous, mainly upper florets distorted and enlarged ..... **Poa**
64b Spikelets usually not viviparous:
65a All spikelets awnless and not mucronate: (65b on p. 667)
66a Spikelets in pairs, one sessile and the other pedicelled, dissimilar in form and sex; pedicelled spikelet very reduced or absent and pedicel empty ..... **Rhytachne**
66b Spikelets solitary or clustered, if paired, spikelets all similar in form and sex:
67a Glumes ± equal in size:
68a Florets 2 or 3 per spikelet; lowest 1 or 2 florets sterile or reduced to lemmas, upper floret bisexual:
69a Spikelet with 2 florets ..... **Tarigidia**
69b Spikelet with 3 florets:
70a Glumes 5-nerved; lower 2 sterile florets usually larger than upper bisexual floret ..... **Ehrharta**
70b Glumes 3-nerved; lower 2 sterile florets very small to more than half as long as the larger upper bisexual floret ..... ***Phalaris**
68b Florets 2–many per spikelet; lowest floret bisexual, upper sometimes sterile or reduced:
71a Spikelet (15–)28–40 mm long; inflorescence a true spike; spikelet falling with glumes..... **Thinopyrum**
71b Spikelet 1.0–15.0 mm long; inflorescence a contracted panicle or raceme; spikelet disarticulating above glumes:
72a Spikelet 10–15 mm long; upper sterile spikelets compacted to form a club-shaped body on prolonged rachis ..... **Melica**
72b Spikelet 1–7 mm long; upper spikelets, if sterile, not forming a club-shaped body:
73a Spikelet 1–3 mm long; lemma 3-nerved ..... **Diandrochloa**
73b Spikelet 3–7 mm long; lemma 3–7(–11)-nerved, if 3 mm long, lemma 5-nerved:
74a Palea of mature spikelet projecting, thinner in texture than lemma; spikelet shining.... **Koeleria**
74b Palea of mature spikelet not projecting, same texture as lemma; spikelet not shining..... **Poa**

67b Glumes unequal in size, sometimes lower one reduced or absent (terminal spikelets often have both glumes well developed):
75a Florets 3, lower 2 sterile, usually different and larger than upper bisexual floret ..... **Ehrharta**
75b Florets 2 or more, all bisexual or upper or lowermost ones reduced and sterile:
76a Inflorescence a spike; spikelets sunk into partial cavities on alternate sides of central axis; lower glume absent or rarely minute (present in terminal spikelet); upper glume facing outwards:
77a Spikelet laterally compressed; disarticulating above glumes; lemma 5–7-nerved (best seen on inner surface) ..... ***Lolium**
77b Spikelet dorsiventrally compressed, falling with glumes; lemma 3-nerved ..... **Lepturus**
76b Inflorescence a contracted raceme or panicle, branches appressed, not sunk into central axis; lower glume usually present, sometimes reduced in size:
78a Spikelet with 2 florets; upper lemma indurated; upper glume prominently nerved, usually gibbous; inflorescence mostly cylindrical ..... **Sacciolepis**
78b Spikelet with 2 or more florets; no lemma indurated; upper glume never gibbous; inflorescence not cylindrical:
79a Spikelet 1–3 mm long (lemma 3-nerved, if 5-nerved see *Poa*) ..... **Diandrochloa**
79b Spikelet 4–20 mm long:
80a Lemma without median keel, usually rounded on back, at least at base:
81a Lemma glabrous or shortly hairy; upper floret similar in form, sometimes reduced in size ..... **Festuca**
81b Lemma with long hairs; upper florets reduced to lemmas compacted to form a club-shaped body ..... **Melica**
80b Lemma with medium keel:
82a Palea of mature spikelet projecting; spikelet shining ..... **Koeleria**
82b Palea of mature spikelet not projecting; spikelet not shining ..... **Poa**

65b All or some spikelets awned or mucronate: (65a on p. 666)
83a Spikelets in triads, central spikelet well developed, bisexual, 2 lateral spikelets male or sterile, smaller or reduced (sometimes reduced to awns) ..... **Hordeum**
83b Spikelets solitary, in pairs or in clusters, spikelets all similar or pairs sometimes dissimilar in form and sex:
84a Spikelets in pairs, these dissimilar in form and sex, sometimes some pairs on inflorescence similar:
85a Pedicelled spikelet with lower glume drawn out into an awn 5–120 mm long; lemmas of all spikelets awnless ..... **Urelytrum**
85b Pedicelled spikelet with lower glume awnless or with a short awn up to 5 mm long, or entire spikelet reduced to an awn; lemmas of the sessile and/or pedicelled spikelets awned (except in *Rhytachne* where lemmas are awnless):
86a Awn short, straight; internodes clavate ..... **Rhytachne**
86b Awn long, not straight, usually geniculate; internodes linear:
87a Long-pedicelled spikelet bisexual; upper lemma long-awned; subsessile spikelet male or sterile, usually awnless; spikelet pairs usually similar along whole length of raceme..... **Trachypogon**
87b Pedicelled spikelet male or sterile, awnless; sessile spikelet bisexual, upper lemma awned:
88a Inflorescence a panicle of numerous long racemes in whorls up long central axis; spikelets not in homogamous pairs ..... **Bothriochloa**
88b Inflorescence a single raceme; spikelet pairs in lower parts of raceme homogamous (alike in sex and shape), those in upper parts heterogamous (differing in sex and shape) ..... **Heteropogon**
84b Spikelets solitary, in clusters or in pairs, all spikelets similar in form and sex on inflorescence:
89a Spikelets in clusters, clusters often ± subtended by enlarged spreading glumes of lower spikelets ..... **Elytrophorus**
89b Spikelets solitary, paired or clustered, not subtended by glumes of lower spikelets:
90a Florets 3 per spikelet; lower 2 male or sterile; upper bisexual, awnless:
91a Lemma awns dissimilar: lowest lemma awned from upper half, awn usually straight; second lemma awned from near base, awn usually geniculate ..... **Anthoxanthum**
91b Lemma awns similar in position and type ..... **Ehrharta**
90b Florets 2 to many per spikelet; lowest usually bisexual, sometimes male; upper sometimes sterile and reduced, awned or awnless:
92a Florets 2; lower lemma awnless; upper lemma awned with a short stout awn, awn sometimes recurved and hooked ..... **Holcus**
92b Florets 2 to many, all similar, sometimes upper reduced or only lower florets awned:
93a Lower glumes absent in all spikelets (except terminal one), upper glume turned outwards; spikelets partially sunk in cavities, obviously distichous on inflorescence..... ***Lolium**
93b Lower glumes present in all spikelets, but sometimes very reduced:
94a Glumes ± as long as to longer than spikelet:
95a Spikelet mucronate or minutely awned; palea hyaline, projecting and conspicuous in mature spikelets ..... **Koeleria**
95b Spikelet with obvious awn; palea not projecting from mature spikelet:

96a Inflorescence a spike; spikelet 10–15 mm long, long-awned ..... **Secale**
96b Inflorescence a contracted panicle or branches scattered along central axis; spikelet 2–11 mm long, short-awned:
97a Inflorescence a dense, contracted panicle; upper glume 3-nerved ..... ***Lophochloa**
97b Inflorescence of numerous branches scattered up central axis; upper glume 1-nerved ..... **Trichoneura**
94b Glumes shorter than spikelet, at least lower glume much shorter (in *Helictotrichon galpinii* glumes just shorter than spikelet):
98a Awns geniculate or bent, often twisted:
99a Lower lemma awned from between lobes; lowest floret bisexual ..... **Helictotrichon**
99b Lower lemma awned from lower third of back; lowest floret usually male..... ***Arrhenatherum**
98b Awns straight or mucro present:
100a Spikelet 2–6 mm long:
101a Lemma bilobed; awns obvious; annuals ..... ***Lophochloa**
101b Lemma entire; awns not obvious; perennials, rarely annuals:
102a Palea thinner in texture than lemma, obvious in mature spikelet ..... **Koeleria**
102b Palea similar in texture to lemma, not obvious in mature spikelet ..... **Poa**
100b Spikelet 7–44 mm long:
103a Inflorescence a spike:
104a Spikelet 10–20 mm long ..... ***Elytrigia**
104b Spikelet (15)28–40 mm long ..... **Thinopyrum**
103b Inflorescence a condensed panicle or single raceme:
105a Lemma awn very short ..... **Festuca**
105b Lemma awn long:
106a Lower glume 0- or 1-nerved:
107a Glumes ± similar in form and texture; ovary with apical appendage ..... **Bromus**
107b Glumes dissimilar in form and texture; ovary glabrous or hairy, without apical appendage ..... ***Vulpia**
106b Lower glume 3–9-nerved:
108a Inflorescence a panicle (rarely a raceme); ovary with apical appendage ..... **Bromus**
108b Inflorescence a raceme with spikelets on opposite side of rachis; ovary without apical appendage ..... **Brachypodium**

63b Ligule a fringed membrane (fringe sometimes minute) or a fringe of hairs: (63a on p. 666)
109a All or some spikelets awned or mucronate: (109b on p. 670)
110a Lemma margins lobed; lobes with large flat awns, median lobes sometimes with smaller awns; lemma becoming distinctly indurated, apex between marginal nerves bent forward; glumes 9–11-nerved.... ..... **Kaokochloa**
110b Characters not in above combination:
111a Lemma 5- or 9-awned:
112a Lemma 5-awned, awns scabrid, alternating with hyaline lobes ..... **Schmidtia**
112b Lemmas 9-awned, awns plumose or scabrid, not alternating with hyaline lobes ..... **Enneapogon**
111b Lemma 1–3-awned or mucronate (at least one lemma):
113a Spikelets paired, usually dissimilar in sex and form (heterogamous), often one sessile and the other pedicelled (pedicel sometimes fused to rachis but discernable):
114a Upper lemma of sessile spikelet awnless:
115a Sessile spikelet hairy to sparsely hairy; lower glume with oil streaks along keels; inflorescence obvious; pedicels free ..... **Elionurus**
115b Sessile spikelet glabrous; lower glume without oil streaks along keel; inflorescence culm-like; pedicels fused ..... **Hemarthria**
114b Upper lemma of sessile spikelet awned or mucronate:
116a Sessile spikelet 9–15 mm long; upper palea well developed ..... **Sehima**
116b Sessile spikelet 2.5–9.0(–11) mm long; upper palea reduced or absent:
117a Inflorescence a panicle of numerous long racemes in whorls on a long central axis; lower glume of sessile spikelet usually with 1–3 pits ..... **Bothriochloa**
117b Inflorescence a single raceme; lower glume of sessile spikelet without pits:
118a Inflorescence with up to three-quarters of lower part with homogamous, awnless spikelet pairs; upper lemma of sessile spikelet entire ..... **Heteropogon**
118b Inflorescence with spikelet pairs usually similar along whole length of raceme; upper lemma of sessile spikelet usually 2-lobed ..... **Schizachyrium**
113b Spikelets solitary, clustered or paired, all similar in sex and form:
119a One or more lemmas with median awn geniculate or at least twisted in lower part:
120a Glumes unequal in size:
121a Ligule a fringed membrane ..... **Arundinella**
121b Ligule a fringe of hairs:

122a Lemma hairs in tufts or fringes or in tufts mixed with dispersed hairs ..... **Danthoniopsis**
122b Lemma glabrous or with dispersed hairs..... **Loudetia**
120b Glumes ± equal in size:
123a Spikelet with 2 florets:
124a Florets dissimilar in form; upper floret specialised male or sterile; lemma awned with stout hooked awn; lower lemma awnless; upper glume awned..... **Holcus**
124b Florets similar in form; both similarly awned or lower lemma awnless; upper glume awnless:
125a Lemma 6–16 mm long, lobes usually with short fine awns ..... **Merxmuellera**
125b Lemma 2.0–5.8 mm long, lobes usually with long stout awns:
126a Articulation on pedicel situated some distance below spikelet and bearded with long hairs; spikelet falling with glumes..... **Chaetobromus**
126b Articulation not present on pedicel; spikelet disarticulating above glumes…..…..
..... **Pentaschistis**
123b Spikelet with 3 to many florets:
127a Spikelet 4–7 mm long ..... **Karroochloa**
127b Spikelet 7.5–25.0 mm long:
128a Articulation on pedicel situated some distance below spikelet and bearded with long hairs; spikelet falling with glumes..... **Chaetobromus**
128b Articulation not present on pedicel; spikelet disarticulating above glumes:
129a Glumes prominently 7–11-nerved; callus pungent ..... **Centropodia**
129b Glumes 1–5(7)-nerved; callus rounded or long, narrowly obtuse:
130a Glumes 1-keeled to middle or below; palea similar in texture to lemma…….....
..... **Merxmuellera**
130b Glumes rounded, flat or with more than 1 keel; palea thinner than lemma..……
..... **Dregeochloa**
119b One or more lemmas mucronate or with a straight median awn:
131a Spikelet with 2 or 3 florets, lower 1 or 2 florets male or sterile, uppermost bisexual:
132a Florets 3; upper glume and lower lemmas dissimilar; lower glume well developed, 5-nerved; lower two lemmas specialised, usually larger and different from upper lemma.…..
..... **Ehrharta**
132b Florets 2; upper glume and lower lemma often similar; lower glume often reduced, 0–3-nerved; lower lemma usually shorter than to as long as upper lemma:
133a Inflorescence a contracted panicle ..... **Melinis**
133b Inflorescence of racemes scattered along central axis:
134a Glumes unequal; lower glume acute to acuminate, often mucronate ..... **Echinochloa**
134b Glumes ± equal; lower glume long-awned..... **Oplismenus**
131b Spikelet with 2 to many florets; lowest floret bisexual; upper bisexual or sterile, or with lower and upper florets sterile and remaining bisexual:
135a Glumes obviously much shorter than spikelet:
136a Lower glume 3–7-nerved:
137a Lemma emarginate to well-lobed:
138a Lower glume 3-nerved; glumes coriaceous to subcoriaceous ..... **Brachychloa**
138b Lower glume 5–7-nerved; glumes membranous ..... **Schismus**
137b Lemma entire:
139a Spikelet spiny due to stout deflexed awns of lemmas; fertile lemma firmer in texture than glumes ..... **Entoplocamia**
139b Spikelet not spiny, awns slender; fertile lemma less firm than, to similar in texture to glumes:
140a Lemma glabrous; spikelet 10–44 mm long ..... **Brachypodium**
140b Lemma hairy; spikelet 1.5–7.0(–10) mm long ..... **Tribolium**
136b Lower glume 1-nerved:
141a Inflorescence a solitary spike; spikelets borne alternately up along rachis..... **Tripogon**
141b Inflorescence a panicle or raceme with branches closely appressed to or stiff and at right angles to central axis, or with dense clusters of spikelets at intervals on central axis:
142a Lemma glabrous (rarely with tubercle-based hairs on side nerves):
143a Glumes sparsely hairy ..... **Elytrophorus**
143b Glumes glabrous:
144a Lemma 5–7-nerved..... **Brachychloa**
144b Lemma 3-nerved:
145a Lemma lanceolate to ovate-lanceolate; inflorescence resembling a herring bone due to many stiff side branches..... **Pogonarthria**
145b Lemma ovate, elliptic to oblong; inflorescence not resembling a herring bone ..... **Eragrostis**
142b Lemma hairy:
146a Lemma deeply lobed, 3-awned:

147a Lemma with lateral nerves glabrous or minutely hairy; glumes 3-lobed or entire; base of plant with dense fibrous sheaths ..... **Styppeiochloa**
147b Lemma with lateral nerves long-hairy; glumes usually 2-lobed; base of plant without fibrous sheaths ..... **Triraphis**
146b Lemma entire or not deeply lobed, 1-awned or mucronate:
148a Leaf blades short, distichous, pungent; perennials ..... **Odyssea**
148b Leaf blades not pungent; annuals:
149a Lemma mucronate:
150a Glumes glabrous to minutely scaberulous ..... **Brachychloa**
150b Glumes densely hairy with tubercle-based hairs ..... **Stiburus**
149b Lemma awned:
151a Inflorescence silky; leaves broad, lanceolate to ovate; glumes very unequal ..... **Leptocarydion**
151b Inflorescence bristly; leaves narrow, linear; glumes ± equal to slightly unequal ..... **Elytrophorus**
135b Glumes (at least upper glume) ± as long as to much longer than spikelet:
152a Lower glume 1- or 2-nerved:
153a Inflorescence of short, stiff spikes spaced up to 30 mm apart, ascending at first, reflexing at maturity ..... **Dinebra**
153b Inflorescence dense and continuous or of dense, globose clusters at intervals on central axis:
154a Glumes with tubercle-based hairs ..... **Stiburus**
154b Glumes glabrous or hairy, hairs not tubercle-based:
155a Annual hydrophytes ..... **Elytrophorus**
155b Perennials, rarely annuals but then not hydrophytic:
156a Spikelet 1–3 mm long ..... **Chloris**
156b Spikelet 4–25 mm long:
157a Lemma keeled; spikelet strongly laterally compressed ..... **Fingerhuthia**
157b Lemma rounded on back; spikelet not strongly laterally compressed..... **Merxmuellera**
152b Lower glume 3–11-nerved:
158a Articulation on pedicel situated some distance below spikelet and bearded with long hairs; spikelet falling with glumes ..... **Chaetobromus**
158b Articulation not present on pedicel; spikelet disarticulating above glumes:
159a Glumes with keels usually with large, prominent, stalked glands ..... **Prionanthium**
159b Glumes with keels eglandular or glands not prominent or stalked:
160a Spikelet 9–13 mm long ..... **Merxmuellera**
160b Spikelet 1.5–7.0(–10) mm long:
161a Lemma lobed or emarginate ..... **Schismus**
161b Lemma entire, rarely minutely emarginate ..... **Tribolium**

109b All spikelets muticous: (109a on p. 668)
162a Spikelets in pairs, usually one sessile and the other pedicelled, these differing in form and sex, sometimes unequally pedicelled and similar in form and sex; pedicels free or fused and ± discernible:
163a Annuals; internodes fused to adjacent pedicels, pedicels hardly discernible; basal sheaths usually with irritant hairs ..... **Rottboellia**
163b Perennials; pedicels discernable; basal sheaths without irritant hairs:
164a Inflorescence of a number of branches ± appressed to central axis; callus with tawny hairs half as long as to longer than spikelet ..... **Eriochrysis**
164b Inflorescence a single raceme; hairy callus present or absent, hairs white to silver, usually less than half as long as spikelet:
165a Lower glume winged, without oil streaks along keels; spikelet and callus glabrous; rachis joints transverse; callus truncate, with peg ..... **Coelorachis**
165b Lower glume wingless, usually with oil streaks along keels; spikelet and callus hairy (sometimes sparsely so); rachis joints oblique; callus cuneate, without peg ..... **Elionurus**
162b Spikelets apparently solitary, in pairs or clusters, similar in form and sex:
166a Inflorescence white to silvery due to long silky hairs from callus and glumes which almost conceal spikelets ..... **Imperata**
166b Inflorescence glabrous or hairy, hairs not long and silky, not concealing spikelets:
167a Lower 1 or 2 florets sterile, male or reduced; upper floret bisexual:
168a Florets 3 per spikelet:
169a Lower sterile florets usually larger than upper bisexual floret, sometimes lowest floret very small and reduced; glumes 5-nerved ..... **Ehrharta**
169b Lower sterile florets very small to more than half as long as upper bisexual floret; glumes 3-nerved ..... ***Phalaris**
168b Florets 2 per spikelet:
170a Inflorescence a single cylindrical raceme; spikelets sunk into rachis; upper bisexual lemma less firm in texture than glumes ..... **Oxyrachis**

170b Inflorescence a contracted panicle or a number of racemes scattered up along central axis (racemes, not spikelets, may be sunk into central axis); upper bisexual lemma usually similar to, to firmer in texture than glumes:
171a Upper lemma hairy ..... **Entolasia**
171b Upper lemma glabrous:
172a Inflorescence of a number of racemes scattered up along central axis:
173a Spikelet glabrous, abaxial to rachis ..... **Paspalidium**
173b Spikelet hispid or hispidulous, adaxial to rachis ..... **Echinochloa**
172b Inflorescence a contracted panicle, sometimes cylindrical:
174a Upper glume and lower lemma hairy, hairs in tufts or fringes; upper glume not gibbous; spikelet 7 mm long ..... **Leucophrys**
174b Upper glume and lower lemma glabrous; upper glume gibbous; spikelet 1.3–4.5 mm long ..... **Sacciolepis**
167b Florets 2–many, all bisexual or upper reduced:
175a Glumes shorter than spikelet:
176a Glumes 1-nerved, rarely 3-nerved; lemma 3-nerved:
177a Plants prickly:
178a Plant woody; central axis of inflorescence very stout and stiff, resembling culms, often ending in a pungent point, inflorescence sparse; lemma glabrous or very shortly hairy; glumes ± equal ..... **Cladoraphis**
178b Plants not woody; inflorescence not very stout and stiff usually ending in a spikelet or soft point, inflorescence dense; lemma with silky hairs on lower part of nerves; glumes unequal ..... **Odyssea**
177b Plants not prickly:
179a Lemma hairy all over with long hairs ..... **Stiburus**
179b Lemma glabrous or hairs present on nerves only:
180a Lemma lanceolate to ovate-lanceolate; inflorescence resembling a herring bone due to numerous stiff side branches ..... **Pogonarthria**
180b Lemma ovate, elliptic to oblong; inflorescence not resembling a herring bone..... ..... **Eragrostis**
176b Glumes 3–7-nerved; lemma 5–9-nerved:
181a Lemma lobed or emarginate ..... **Schismus**
181b Lemma entire, rarely emarginate ..... **Tribolium**
175b Glumes as long as to longer than spikelet:
182a Florets 2 per spikelet:
183a Lower glume 1-nerved:
184a Lemma entire, keeled; glumes minutely to long-hairy on keels ..... **Fingerhuthia**
184b Lemma lobed, rounded on back; glumes glabrous or puberulous all over ..... **Pentaschistis**
183b Lower glume 3–8-nerved:
185a Glumes rounded at apex ..... **Prionanthium**
185b Glumes acute to acuminate at apex ..... **Tribolium**
182b Florets 3–many per spikelet:
186a Spikelet strongly laterally compressed; glumes 1-nerved ..... **Fingerhuthia**
186b Spikelet laterally to not noticeably compressed; glumes 3–7-nerved:
187a Lemma lobed or emarginate ..... **Schismus**
187b Lemma entire, rarely emarginate ..... **Tribolium**

Key 5 (*Inflorescence a panicle or raceme, or with spike-like branches scattered up the central axis*)

1a Lemma 5- or more-awned:
2a Lemma with two side nerves produced into large flat awns, other nerves excurrent into smaller awns; lemma not deeply cleft, becoming distinctly indurated; callus absent; palea apically notched ..... **Kaokochloa**
2b Lemma nerves excurrent into thin awns or awns alternating with awnless lobes, awns not large and flat; lemma deeply cleft, not becoming indurated; callus short; palea entire:
3a Lemma 5-awned, awns scabrid, alternating with hyaline lobes ..... **Schmidtia**
3b Lemmas 9-awned, awns plumose or scabrid, not alternating with hyaline lobes ..... **Enneapogon**
1b Lemma awnless, or less than 5-awned:
4a Leaf blade with cross venation (usually more conspicuous on lower surface):
5a Inflorescence of 2–6 racemes or fascicles of spikelets scattered up central axis; florets 2, lower floret sterile or male, upper floret bisexual:
6a Lower glume awnless; upper glume gibbous, longer than spikelet ..... **Pseudechinolaena**
6b Lower glume awned; upper glume not gibbous, shorter than spikelet ..... **Oplismenus**
5b Inflorescence an open or contracted panicle; florets 1–many, all bisexual or upper reduced and sterile:
7a Leaf blade pseudopetiolate; male and female spikelets on same inflorescence (males below females, or on lower parts of panicle); female spikelets with 1 floret, lower glume drawn out into an awn up to 20 mm long; male spikelets with lemma awned; plants woody ..... **Olyra**

7b Leaf base not pseudopetiolate; spikelets all alike on inflorescence; glumes and lemmas awnless or with short mucro or awn; plants herbaceous:
8a Florets many per spikelet; florets all alike in function or upper sterile, often smaller; upper glume 3- or 4-nerved; lemma shortly 2-lobed or emarginate, not becoming indurated; spikelet laterally compressed..... **Megastachya**
8b Floret 2 per spikelet; lower floret male or sterile, upper floret bisexual; upper glume 5-nerved; upper lemma entire, indurated, shining ..... **Panicum**
4b Leaf blade without obvious cross venation:
9a Ligule absent; florets 2 per spikelet, upper lemma indurated ..... **Echinochloa**
9b Ligule present (may be absent in some leaves); florets 1–many, upper lemma may or may not be indurated:
10a Ligule an unfringed membrane (sometimes minutely or sparsely ciliolate or fimbriate): (10b on p. 676)
11a Spikelet unconventional and hard to interpret; glumes absent or very reduced or specialised:
12a Florets apparently 1 per spikelet (sterile lemmas suppressed); glumes absent or reduced to rim, lemma boat-shaped, keels rigidly ciliate ..... **Leersia**
12b Florets 3 per spikelet; lower florets sterile and reduced to lemmas; glumes absent or very reduced or joined, forming a cup:
13a Bisexual floret with lemma not strongly keeled, membranous to chartaceous; leaves heterophyllous, some leaves clinging by retrosely scabrid blade margins; climbing forest grasses; lemma awnless; caryopsis longitudinally grooved ..... **Prosphytochloa**
13b Bisexual floret with lemma strongly keeled, coriaceous; leaves not heterophyllous; not climbing forest grasses; lemma long-awned (awn 10–160 mm long); caryopsis not grooved ..... **Oryza**
11b Spikelet conventional; glumes, at least upper one, usually present:
14a Floret 1 per spikelet:
15a Glumes shorter than spikelet:
16a Lemma awnless; spikelet 2.5–4.0 mm long; rachilla extension not present; plants of wet areas in high altitude grassland ..... **Colpodium**
16b Lemma awned, awn long and straight; spikelet 7–9 mm long; rachilla extension present; forest grass..... **Festuca**
15b Glumes ± as long as to longer than spikelet:
17a Lemma less firm to similar in texture to glumes, not becoming indurated; lemma awnless, mucronate or awned; awn slender:
18a Spikelet 5.5–8 mm long; callus beaded with conspicuous white hairs longer than lemma; plant tall, robust ..... **Calamagrostis**
18b Spikelet up to 5.5 mm long; callus absent, if present, then glabrous or hairy, hairs inconspicuous, up to half as long as lemma; plant small, slender:
19a Spikelet falling with glumes; lemma awnless or awned, central awn arising at or near apex..... **Polypogon**
19b Spikelet disarticulating above glumes; lemma awnless or awned, central awn arising well below apex or at base:
20a Inflorescence a panicle with spikelets not secund on branches; lemma not keeled ..... **Agrostis**
20b Inflorescence of one-sided racemes scattered along central axis due to spikelets being secund on branches; lemma keeled ..... **Leptochloa**
17b Lemma firmer in texture than glumes, becoming indurated; lemma awnless, mucronate or awned, awn robust:
21a Lemma margins strongly and firmly overlapping, lemma thick and stiff; palea a third or less of length of lemma, hyaline, glabrous, nerveless; asymmetrically awned; spikelet gibbous..... ***Nassella**
21b Lemma margins slightly overlapping, involute or open, lemma thickly membranous to coriaceous; palea at least half as long as lemma, pubescent or glabrous, usually 2-nerved; awn central; spikelet not gibbous ..... **Stipa**
14b Florets 2 or more per spikelet:
22a Florets 2 per bisexual spikelet; rachilla extension present or absent: (22b on p. 674)
23a Spikelets paired (terminal spikelets often in triads), usually dissimilar in function, one sessile and the other pedicellate, sometimes pedicel without a spikelet, or spikelets unequally pedicelled:
24a Lower glumes with 1–3 pits; pedicels and internodes longitudinally grooved with a translucent median line ..... **Bothriochloa**
24b Lower glume without pits; pedicels and internodes not grooved with a translucent median line:
25a Pedicelled spikelets all awnless ..... **Sorghum**
25b Pedicelled spikelets usually reduced to pedicels, sometimes some pedicels bear awned spikelets similar to sessile ones on same inflorescence ..... **Sorghastrum**
23b Spikelets solitary, paired or in groups, all similar in function:
26a Lower floret male or sterile; upper bisexual:
27a Lower floret with stout, geniculate awn from lower third of lemma..... ***Arrhenatherum**
27b Lower floret awnless or, if awned, awn not geniculate:
28a Upper glume gibbous:
29a Glumes very unequal in size, distinctly ribbed, upper glume without rigid hairs developing after fertilisation; spikelet 2.5–3.5 mm long ..... **Sacciolepis**
29b Glumes ± equal in size, not distinctly ribbed, upper glume with rigid hairs developing after fertilisation; spikelet 3.5–5.0 mm long..... **Pseudechinolaena**
28b Upper glume not gibbous:

30a Upper lemma awned:
31a Spikelets solitary; glumes similar; spikelet light brown to black ..... **Cleistachne**
31b Spikelets paired; glumes very dissimilar; spikelet pale-coloured:
32a Spikelets unequally pedicellate; lower glume flattened on back; inflorescence a panicle; plants robust, tufted ..... **Miscanthus**
32b Spikelets: one sessile and the other pedicelled; lower glume with broad median groove; inflorescence of spike-like racemes along central axis; plants delicate, usually rambling or creeping ..... **Microstegium**
30b Upper lemma awnless or mucronate:
33a Spikelet surrounded by an involucre of long, spreading hairs from callus ..... **Miscanthus**
33b Spikelet not obviously surrounded by involucre of long, spreading hairs from callus or callus glabrous or absent:
34a Lower glume conspicuously awned ..... **Oplismenus**
34b Lower glume awnless or minutely awned:
35a Lemma margins lying flat and enclosing palea:
36a Lower glume up to a quarter of length of spikelet ..... **Digitaria**
36b Lower glume two-thirds of length of spikelet ..... **Tarigidia**
35b Lemma margins inrolled and clasping palea edges:
37a Inflorescence a panicle, open or condensed ..... **Panicum**
37b Inflorescence of spike-like racemes scattered along the central axis:
38a Lower glume adaxial (adjacent to rachis; sometimes difficult to see); lower glume well developed ..... **Brachiaria**
38b Lower glume abaxial (turned away from rachis), sometimes lower glume absent but spikelet still turned in this position; lower glume absent or scale-like, rarely up to half as long as spikelet ..... **Paspalum**

26b Both florets bisexual or upper male, sterile or reduced:
39a Lemmas all awnless:
40a Spikelet large, 7–45 mm long; ovary pilose; glumes as long as to longer than spikelet ..... ***Avena**
40b Spikelet small, up to 8 mm long; ovary glabrous; glumes shorter than to rarely ± as long as spikelet:
41a Lemma distinctly keeled on back, at least near base:
42a Spikelet 3.0–6.0 mm long; lemma 5–7(11)-nerved ..... **Poa**
42b Spikelet 1.0–3.5 mm long; lemma 3-nerved:
43a Inflorescence a panicle, dense, divaricately branched; stamens 2 ..... **Diandrochloa**
43b Inflorescence of spike-like racemes scattered along central axis; stamens 3 ..... **Leptochloa**
41b Lemma rounded on back, at least at base (sometimes keeled on all nerves):
44a Glumes ± equal in size:
45a Glumes shorter than spikelet; internodes elongated between florets ..... ***Periballia**
45b Glumes ± as long as spikelet; internodes not elongated between florets ..... ***Aira**
44b Glumes unequal in size:
46a Annuals; lower glume minute, scale-like to almost absent, 0-nerved; spikelet 2–3 mm long ..... ***Sphenopus**
46b Perennials; lower glume well developed, 1–3-nerved; spikelet 3–20 mm long:
47a Lemma 1–3 mm long, tips scarious, obtuse or blunt, often ragged ..... **Puccinellia**
47b Lemma 3.5–11.0 mm long, tips firm, acute ..... **Festuca**
39b Lemmas all, or at least one in spikelet, awned or mucronate:
48a Lemma awn with ring of hairs at junction of twisted column and clavate limb ..... ***Corynephorus**
48b Lemma mucronate or awned, awn without a ring of hairs or clavate limb:
49a Lower lemma awnless; upper lemma with short hooked awn from back near apex; spikelets falling with glumes ..... **Holcus**
49b Lemmas all similar, all awned or mucronate (upper lemmas may be reduced); spikelets disarticulating above glumes:
50a Annuals:
51a Spikelet 18–46 mm long ..... ***Avena**
51b Spikelet 1.9–14.0 mm long:
52a Glumes shorter than spikelet:
53a Lemma minutely awned or mucronate; upper glume keeled ..... **Leptochloa**
53b Lemma awn long and obvious; upper glume rounded on back ..... ***Vulpia**
52b Glumes as long as to longer than spikelet:
54a Lemma awn geniculate or at least slightly bent ..... ***Aira**
54b Lemma mucronate or awned, awn straight:
55a Lemma with long, obvious hairs on margins; glume tips straight; lemma with fine bristle-like awn, rounded on back ..... **Trichoneura**
55b Lemma pilose around lower half of midrib, or glabrous; glumes with caudate curving tips; lemma mucronate, keeled ..... **Dinebra**
50b Perennials:

56a Awn of lemma, at least of lower lemma, much longer than body of lemma:
57a Awn of lemma very long and flexuous, intertwining with awns from other florets, resulting in spikelet falling as a unit ... **Streblochaete**
57b Awn of lemma stiff, not flexuous and intertwining with awns of other florets for spikelet to fall as a unit:
58a Spikelet 3–6 mm long; ovary glabrous ... ***Deschampsia**
58b Spikelet 7–30 mm long; ovary hairy:
59a Lower lemma with central awn from upper third of back; lemma awns all similar ... **Helictotrichon**
59b Lower lemma with central awn from lower third of back; lemma awns differ in same spikelet ... ***Arrhenatherum**
56b Awn of lemma shorter than, to equal to body of lemma, rarely slightly longer than lemma or mucronate:
60a Glumes unequal in size:
61a Spikelet 5–20 mm long:
62a Lemma rounded on back, at least near base; inflorescence not lobed, spikelets not in dense one-sided clusters ... **Festuca**
62b Lemma strongly keeled; inflorescence lobed with dense clusters of spikelets crowded on one side at ends of branches ... ***Dactylis**
61b Spikelet 2–4 mm long:
63a Inflorescence a dense, contracted panicle; spikelet 3.5–4.0 mm long; membranous palea projecting out of mature florets; lemma entire ... **Koeleria**
63b Inflorescence open, of numerous racemes scattered along elongated central axis; lemma 2-lobed ... **Leptochloa**
60b Glumes ± equal in size:
64a Inflorescence lobed, dense clusters of spikelets crowded on one side at ends of branches ... ***Dactylis**
64b Inflorescence open or contracted, not lobed:
65a Inflorescence of racemes scattered along central axis; spikelet 5.5–9.0 mm long ... **Bewsia**
65b Inflorescence a panicle; spikelet 3–6 mm long:
66a Inflorescence open; lemma awned from near base, rounded on back ... ***Deschampsia**
66b Inflorescence contracted; lemma awned or mucronate from apex or just below, keeled ... **Koeleria**

22b Florets more than 2 per bisexual spikelet: (22a on p. 672)
67a Florets 3, lower 2 sterile or male (often reduced to lemma only), upper floret bisexual:
68a Glumes reduced to minute lips, separated from florets by a stipe ... ***Microlaena**
68b Glumes conventional, lower sometimes shorter than upper or reduced, not separated from florets by a stipe:
69a Upper glume 5-nerved; lower two lemmas usually similar, awnless or tapering into awns, (sometimes only one awned) ... **Ehrharta**
69b Upper glume 3-nerved; first lemma awned from above middle of back, awn usually straight; second lemma awned from near base, awn often robust, twisted in lower part ... **Anthoxanthum**
67b Florets 3 or more, if 3 then lower floret bisexual and uppermost sterile or reduced:
70a Lemma as broad as long, gibbous and cordate at base; lemma 7–9-nerved ... ***Briza**
70b Characters not in same combination as for *Briza*:
71a Lemma awnless:
72a Spikelet 1.0–3.5 mm long:
73a Lemma 5–many-nerved; upper glume usually 3-nerved:
74a Glumes ± equal in size, rarely unequal, keeled ... **Poa**
74b Glumes very unequal in size, not keeled ... **Puccinellia**
73b Lemma 3-nerved; upper glume 1-nerved, 1–3-nerved in *Koeleria*:
75a Inflorescence of racemes scattered along central axis ... **Leptochloa**
75b Inflorescence an open or contracted panicle:
76a Lemma rounded but keeled on 3 nerves; lower glume 0-nerved ... ***Sphenopus**
76b Lemma strongly keeled; lower glume usually 1-nerved:
77a Annuals; spikelet 1–3 mm long; lemma 0.5–1.0 mm long ... **Diandrochloa**
77b Perennials; spikelet 3.5–4.0 mm long; lemma 3–5 mm long ... **Koeleria**
72b Spikelet 4–90 mm long:
78a Lemma distinctly and strongly keeled:
79a Palea thinner in texture than lemma; lemma 3-nerved; glumes as long as to longer than spikelet ... **Koeleria**
79b Palea similar in texture to lemma; lemma 5–many-nerved; glumes shorter than spikelet ... **Poa**
78b Lemma rounded on back, at least at base or keelless:
80a Upper glume 1-nerved:
81a Spikelet laterally compressed; lemma acute and entire ... **Festuca**

81b Spikelet ± terete or dorsivenrally to not noticeably compressed; lemma ± truncate or 2-lobed ..... **Leptochloa**

80b Upper glume 3–11-nerved:

82a Glumes unequal in size:

83a Upper florets reduced to lemmas, these form a terminal club-shaped appendage; lower lemmas with long silky hairs ..... **Melica**

83b Upper florets, if reduced, not forming a clavate appendage; lower lemmas glabrous or short-hairy:

84a Spikelet 6–20 mm long; lemma tips firm, acute ..... **Festuca**

84b Spikelet 3.0–5.5 mm long; lemma tips scarious, blunt, often somewhat ragged..... ..... **Puccinellia**

82b Glumes ± equal in size:

85a Glumes much shorter than spikelet; spikelet 5–7(–10) mm long; annuals ..... **Catapodium**

85b Glumes equal to or longer than spikelet; spikelet 5–46 mm long; annuals or perennials:

86a Spikelet 5–15 mm long; upper florets reduced to lemmas, these forming a club-shaped appendage; perennials ..... **Melica**

86b Spikelet 17–46 mm long; upper florets sometimes reduced but not forming a club-shaped appendage; annuals ..... ***Avena**

71b Lemma awned or mucronate (sometimes minutely so):

87a Lemma with flexuous awn up to 3 times longer than body of lemma, all awns of a spikelet twisting together and spikelet falling as a unit ..... **Streblochaete**

87b Lemma awn short or long, not intertwining with other awns in spikelet and spikelet falling as a unit:

88a Lemma awned, awn geniculate:

89a Glumes as long as to longer than spikelet; annuals; lemma similar in texture to glumes..... ..... ***Avena**

89b Glumes shorter than spikelet (except in *H. galpinii*); perennials; lemma firmer in texture than glumes ..... **Helictotrichon**

88b Lemma mucronate or awned, awn straight:

90a Inflorescence lobed; spikelets in dense, shortly pedicelled, secund clusters at ends of short branches ..... ***Dactylis**

90b Inflorescence not lobed; spikelets not in clusters at ends of short branches:

91a Upper glume 1-nerved:

92a Lemma awn more than half as long as body of lemma:

93a Spikelet 6–20 mm long; annuals; glumes rounded on back ..... ***Vulpia**

93b Spikelet 1–3 mm long; perennials; glumes keeled ..... **Chloris**

92b Lemma mucronate or awn less than half as long as body of lemma:

94a Glumes slightly shorter to much longer than spikelet:

95a Inflorescence a dense contracted panicle ..... **Koeleria**

95b Inflorescence of spike-like racemes scattered along central axis:

96a Lemma with central awn terminal, arising from sinus at apex ..... **Trichoneura**

96b Lemma with central awn from back below apex ..... **Bewsia**

94b Glumes much shorter than spikelet:

97a Inflorescence of racemes scattered along central axis:

98a Lemma awned from back, below apex ..... **Bewsia**

98b Lemma mucronate or awned, from apex:

99a Spikelets 1.9–3.2 mm long, laterally compressed; lemma keeled ..... **Leptochloa**

99b Spikelet 7–14 mm long, ± terete; lemma ± rounded on back..... ..... (=*Diplachne*) **Leptochloa**

97b Inflorescence an open or contracted panicle:

100a Spikelet 6–20 mm long; glumes usually much shorter than adjacent lemmas; lemma rounded on back, at least at base ..... **Festuca**

100b Spikelet 3.5–4.0 mm long; glumes as long as (at least lower) to slightly shorter than adjacent lemmas; lemma keeled ..... **Koeleria**

91b Upper glume 2–11-nerved:

101a Glumes as long as to longer than spikelet or slightly shorter:

102a Spikelet 3–4 mm long; lemma mucronate or awned, awn minute ..... **Koeleria**

102b Spikelet 17–46 mm long; lemma awn conspicuous, much longer than body of lemma..... ***Avena**

101b Glumes shorter than spikelet (except in *Helictotrichon galpinii*):

103a Lower glume 5–9-nerved; ovary with a conspicuous villous appendage at apex:

104a Inflorescence usually an open to contracted panicle ..... **Bromus**

104b Inflorescence usually of racemes scattered up central axis ..... **Brachypodium**

103b Lower glume 0–3-nerved; ovary glabrous or hairy, without villous appendage at apex except in *Bromus*:

105a Ovary with a conspicuous, villous appendage at apex ..... **Bromus**

105b Ovary hairy or glabrous, without villous appendage at apex:
106a Awn as long as or longer than body of lemma:
107a Annuals; lemma entire, apex tapering into an awn ..... ***Vulpia**
107b Perennials; lemma lobed, awn from upper part of back ..... **Helictotrichon**
106b Awn shorter than body of lemma or mucronate:
108a Lemma awned from upper part of back ..... **Helictotrichon**
108b Lemma mucronate or awned from apex or sinus:
109a Lemma rounded on back, at least near base ..... **Festuca**
109b Lemma keeled:
110a Inflorescence of racemes along central axis, these usually forming a compact cluster ..... **Eleusine**
110b Inflorescence an open or contracted panicle ..... **Poa**

10b Ligule a fringe of hairs or a fringed membrane: (10a on p. 672)
111a All or most spikelets in inflorescence subtended by 1 or more bristles (these may not be obvious):
112a Bristle(s) not falling with spikelet ..... **Setaria**
112b Bristle(s) falling with spikelet ..... **Pennisetum**
111b Spikelet not subtended by bristles:
113a Floret 1 per spikelet:
114a Spikelet up to 6 mm long, awnless:
115a Lemma glabrous:
116a Lemma similar in texture to glumes; upper glume not to slightly 1-keeled; inflorescence a panicle; upper glume 0 to slightly 1-keeled ..... **Sporobolus**
116b Lemma less firm in texture than glumes; upper glume flat on back, infolded with 2 keels; inflorescences spike-like racemes scattered up central axis; upper glume 2-keeled ..... **Craspedorhachis**
115b Lemma hairy:
117a Lemma 5–7-nerved; glumes similar in form ..... **Pentaschistis**
117b Lemma 3-nerved; glumes very dissimilar in form:
118a Inflorescence open with racemes scattered up along central axis; glumes ± equal; lemma less firm in texture than glumes ..... **Craspedorhachis**
118b Inflorescence dense and racemes appressed to central axis; glumes very unequal; lemma similar in texture to glumes ..... **Polevansia**
114b Spikelet up to 30 mm long, awned or mucronate (either may be minute), sometimes lemma awnless but then apex awn-like and spikelet 8–15 mm long:
119a Ligule a fringed membrane:
120a Glumes similar in form; spikelet terete to laterally compressed; lemma awn long, geniculate ..... **Stipa**
120b Glumes dissimilar in form; spikelet dorsiventrally compressed, lemma with short mucro:
121a Inflorescence open with racemes scattered up along central axis; glumes ± equal; lemma less firm in texture than glumes ..... **Craspedorhachis**
121b Inflorescence dense and racemes appressed to central axis; glumes very unequal; lemma similar in texture to glumes ..... **Polevansia**
119b Ligule a fringe of hairs:
122a Lemma mucronate or minutely awned or awnless and sometimes awn-like:
123a Spikelet 10–18 mm long; lemma incised; inflorescence large, plumose with many spikelets; large tussock-forming plant up to 4 m tall; lemma awn-like, long drawn-out to a filiform tip..... ***Cortaderia**
123b Spikelet 2–5 mm long; lemma entire; inflorescence of racemes scattered along central axis; small plant up to 1.2 m tall:
124a Glumes very unequal in size; upper glume rounded on back, keelless ..... **Willkommia**
124b Glumes ± equal in size; upper glume flat-backed, 2-keeled ..... **Craspedorhachis**
122b Lemma 3-awned (due to fusion it may appear as a single awn with 3 branches):
125a Lemma hairy, distinctly 2-lobed, lobes awned, central awn present ..... **Pentameris**
125b Lemma glabrous, not appearing lobed, 3 awns from apex of lemma or seemingly from top of column:
126a Awns of lemma all or only central one plumose (*S. anomala* with awn solitary and with a pencil of hairs at base of column); palea indurated ..... **Stipagrostis**
126b Awns of lemma all glabrous, smooth or scabrid, (lateral awns may be reduced or absent); palea not indurated:
127a Upper glume 3–5-nerved; lower glume usually 3-nerved; glumes rounded to flat on back, more than 1-keeled; awns spirally contorted at base; caryopsis with a deep ventral groove… ..... **Sartidia**
127b Upper glume 1(3)-nerved; lower glume nearly always 1-nerved; glumes 1-keeled to middle or below; awns not spirally contorted at base; caryopsis not deeply grooved ..... **Aristida**
113b Florets 2–many per spikelet:
128a Spikelets in triads; pedicels entirely or partly fused mimicking a single spikelet; spikelet long-awned; 2 florets per spikelet ..... **Tristachya**
128b Spikelets solitary, paired, clustered or in triads but then pedicels free; spikelet awned or awnless; with 2–many florets:
129a Florets 2 per spikelet: (129b on p. 679)

130a Upper lemma of bisexual spikelet less firm in texture than glumes; spikelets usually paired, one sessile and the other pedicellate and dissimilar in form and function, or in triads, rarely paired or solitary and similar in form and function:
131a Spikelets solitary or in pairs, equally or unequally pedicelled, or sessile; spikelets of pairs similar in form and sexuality:
132a Lowest floret male or sterile:
133a Glumes very unequal in size; lower lemma resembling upper glume ..... **Melinis**
133b Glumes ± equal in size; lower lemma not resembling upper glume ..... **Miscanthus**
132b Lowest floret bisexual:
134a Plants reed-like; inflorescence a large plumose panicle ..... ***Arundo**
134b Plants not reed-like; inflorescence not large and plumose:
135a Glumes 1-nerved, awned; lemma 3-nerved, minutely toothed ..... **Dinebra**
135b Glumes 3–7-nerved, awnless; lemma 5–7-nerved, entire ..... **Tribolium**
131b Spikelets in pairs, one sessile and the other pedicelled or in triads; spikelets usually dissimilar in form and/or sexuality:
136a Pedicelled spikelet absent, reduced to a pedicel (occasionally with a spikelet on same inflorescence) ..... **Sorghastrum**
136b Spikelets all present:
137a Spikelets in triads, middle spikelet sessile, two lateral spikelets pedicelled ..... **Chrysopogon**
137b Spikelets usually in pairs, but terminal spikelets often in triads:
138a Pedicels and internodes with a longitudinally grooved translucent line; glumes of sessile spikelet usually with pits ..... **Bothriochloa**
138b Pedicels and internodes without a grooved translucent line; glumes of sessile spikelet without pits:
139a Sessile spikelet compressed laterally; inflorescence of many slender, spike-like racemes in whorls on central axis; lower glume of sessile spikelet spinulose ..... **Vetiveria**
139b Sessile spikelet compressed dorsiventrally; inflorescence an open or dense panicle or of spike-like racemes scattered, not whorled, along central axis and densely appressed to central axis; lower glume of sessile spikelet not spinulose:
140a Inflorescence a large, usually open panicle; sessile spikelet usually long-awned; pedicelled spikelet male or sterile, sometimes reduced to a glume ..... **Sorghum**
140b Inflorescence of spike-like racemes ± appressed up central axis; sessile spikelet awnless; pedicelled spikelet female only ..... **Eriochrysis**
130b Lemma of bisexual floret similar to firmer in texture than glumes; spikelets solitary, in pairs, triads or groups, similar in form and function:
141a Lower floret male or sterile, usually reduced to a lemma; upper floret bisexual: (141b on p. 678)
142a Spikelet supported on a bead-like swelling ..... **Eriochloa**
142b Spikelet not supported on a bead-like swelling:
143a Upper lemma awned or mucronate (either can be minute):
144a Upper lemma entire:
145a Inflorescence a panicle:
146a Upper glume and lower lemma awned; upper glume awn 3–4 times longer than body of lemma ..... **Oryzidium**
146b Upper glume and lower lemma awnless or, if awned, awn very short ..... **Brachiaria**
145b Inflorescence of spike-like racemes scattered up central axis:
147a Lower glume adaxial (adjacent to rachis):
148a Upper palea acute with reflexed tip (needs careful dissection); spikelets usually in 4 or more rows ..... **Echinochloa**
148b Upper palea without reflexed tip; spikelets mostly in 1 or 2 rows ..... **Brachiaria**
147b Lower glume abaxial (turned away from rachis) or absent
149a Lower glume or both glumes long-awned ..... **Oplismenus**
149b Both glumes awnless or with short awn point or only upper glume long-awned:
150a Lower glume absent ..... **Paspalum**
150b Lower glume present (sometimes very small):
151a Upper lemma shorter than spikelet; upper palea obtuse, its tip not reflexed... ..... **Urochloa**
151b Upper lemma ± as long as spikelet; upper palea acute, tip often briefly reflexed ..... **Paspalidium**
144b Upper lemma incised (sometimes minutely lobed or emarginate):
152a Ligule a fringed membrane; upper lemma scabrid to scaberulous ..... **Arundinella**
152b Ligule a fringe of hairs; upper lemma usually hairy to glabrous or smooth, rarely scaberulous:
153a Upper lemma glabrous or hairy, hairs not in tufts:
154a Lower lemma 3-nerved ..... **Loudetia**
154b Lower lemma 5–9-nerved:
155a Callus short, oblong, rounded; spikelets ± 10 mm long ..... **Danthoniopsis**
155b Callus long, linear, bifid, pointed or pungent; spikelet 10–35 mm long:

156a Longest pedicel of spikelet group just over twice as long as shortest pedicel, pedicels stout ..... **Loudetia**

156b Longest pedicel of spikelet group much longer than shortest pedicel, not stout ..... **Tristachya**

153b Upper lemma hairy, hairs in tufts or tufts mixed with dispersed hairs:

157a Upper lemma with 2 tufts of hairs; upper palea keels wingless; stamens 2; leaves deflexed..... **Trichopteryx**

157b Upper lemma with 6–8 tufts of hair, sometimes tufts mixed with dispersed hairs; upper palea keels winged; stamens 3; leaves not reflexed..... **Danthoniopsis**

143b Upper lemma awnless or apiculate:

158a Upper lemma hairy ..... **Entolasia**

158b Upper lemma glabrous:

159a Upper lemma with distinct green crest at apex..... **Acroceras**

159b Upper lemma not crested at apex, sometimes beaked:

160a Lower lemma with 2 transverse fringes of long hairs on back; upper glume tapering to an awn-like apex, with 2 tufts or a continuous transverse fringe of long hairs just above middle..... **Leucophrys**

160b Lower lemma and upper glume glabrous, hispidulous or hairy, hairs not in transverse fringes of long hairs on back above middle, tufts of short hairs sometimes present:

161a Inflorescence an open or condensed panicle:

162a Upper lemma coriaceous to crustaceous; lower lemma entire:

163a Spikelet laterally compressed; upper glume gibbous or saccate at base, prominently ribbed..... **Sacciolepis**

163b Spikelet ± dorsally compressed; upper glume usually not gibbous nor prominently ribbed..... **Panicum**

162b Upper lemma cartilaginous; lower lemma emarginate or lobed:

164a Upper floret laterally compressed; spikelet awned or awnless..... **Melinis**

164b Upper floret dorsally compressed; spikelet awnless or minutely mucronate... ..... **Tricholaena**

161b Inflorescence of one-sided racemes scattered up central axis, sometimes with secondary branches:

165a Spikelet hispidulous; upper palea acute, tip reflexed, slightly protuberant (needs careful dissection)..... **Echinochloa**

165b Spikelet hairy or glabrous; upper palea obtuse or acute but then tip not reflexed:

166a Lower glume awned..... **Oplismenus**

166b Lower glume awnless or glume absent:

167a Spikelet abaxial (lower glume turned away from rachis); lower glume usually absent, rarely up to half as long as spikelet ..... **Paspalum**

167b Spikelet adaxial (lower glume turned towards rachis); lower glume present ..... **Brachiaria**

141b Both florets bisexual or upper sterile: (141a on p. 677)

168a Spikelet awnless, 1.5–8.0 mm long (sometimes so long-acuminate as to appear awned):

169a Glumes with long, glassy hairs; lemma with fringe of hairs on margins..... **Tribolium**

169b Glumes glabrous or hairy, hairs not long and glassy; lemmas glabrous or hairy, hairs not in fringes on margins:

170a Spikelet up to 2.5 mm long ..... **Eragrostis**

170b Spikelet 3–7 mm long:

171a Spikelet dorsiventrally compressed..... **Leptochloa**

171b Spikelet laterally compressed:

172a Glumes ± as long as to much longer than spikelet; lemma 2-lobed, dorsally rounded ..... **Pentaschistis**

172b Glumes much shorter than spikelet; lemma entire, keeled:

173a Inflorescence a panicle; upper glumes usually 3-nerved; lemma 5–7(–11)-nerved.... **Poa**

173b Inflorescence of spike-like racemes scattered up central axis (often resembling a herring-bone); upper glume 1-nerved; lemma 3-nerved..... **Pogonarthria**

168b Spikelet awned or mucronate, if awnless then 10–18 mm long (lemma sometimes awn-like):

174a Lower lemma awnless; upper lemma (sterile floret) awned with short stout hooked dorsal awn ..... **Holcus**

174b Lower lemma or both lemmas awned or mucronate, if upper lemma awned, awn not hooked:

175a Lemma mucronate ..... **Dinebra**

175b Lemma awned (lower lemma sometimes awnless):

176a Pedicel articulated a distance below spikelet, beaded with long hairs at articulation point, spikelet and part of pedicel falling as a whole; callus hairy, pungent; glumes as long as or longer than spikelet ..... **Chaetobromus**

176b Characters not precisely as for *Chaetobromus*:

177a Central awn of lemma short and straight, shorter than body of lemma or lemma apex awn-like:
178b Glumes markedly shorter than spikelet:
179a Lemma incised, 3-lobed at apex, hairy; basal sheaths split, forming a hard fibrous base.....**Styppeiochloa**
179b Lemma entire, glabrous; basal sheaths not splitting into fibrous base....**Pogonarthria**
178b Glumes as long as to longer than spikelet:
180a Inflorescence a nonplumose panicle, 170–270 mm long.....**Merxmuellera**
180b Inflorescence a plumose panicle, 300–800 mm long:
181a Plants reed-like, woody; leaves mainly on culm; plants with all spikelets bisexual; ligule a short, fringed membrane; glumes 3–5 mm long.....*Arundo**
181b Plants forming huge tussocks; leaves mainly basal; plants either with all spikelets bisexual or exclusively gynodioecious; ligule a fringe of hairs; glumes 1(–3) mm long.....*Cortaderia**
177b Central awn of lemma geniculate, usually longer than body of lemma:
182a Ovary apex hairy; fruit an achene .....**Pentameris**
182b Ovary apex glabrous; fruit a caryopsis:
183a Glumes 15–60 mm long; lemma firmer in texture than glumes .....**Pseudopentameris**
183b Glumes 2–12(–20) mm long; lemma similar in texture to glumes:
184a Lemma glabrous, if hairy, then hairs not in tufts (if plant tall and reed-like see *Merxmuellera arundinacea*) .....**Pentaschistis**
184b Lemma hairy, hairs in tufts.....**Merxmuellera**

129b Florets 3–many per spikelet: (129a on p. 676)
185a Florets 3 per spikelet, lower 2 sterile, often reduced to lemmas; upper floret bisexual:
186a Callus present, hairy; glumes reduced to minute lips, separated from florets by a stipe ..... *Microlaena**
186b Callus absent; glumes of variable length, not reduced to lips, nor separated from florets by a stipe.....**Ehrharta**
185b Florets 3–many per spikelet, all bisexual or upper male, sterile or reduced, or lower 2 and uppermost sterile or reduced, in between florets bisexual, rarely only male or female:
187a Pedicel articulated a distance below spikelet, bearded with long hairs at articulation point, spikelet and part of pedicel falling as a whole; callus pungent, hairy; glumes as long as to longer than spikelet; spikelet 9–18 mm long.....**Chaetobromus**
187b Characters not precisely as for *Chaetobromus*:
188a Plants reed-like; leaves mainly cauline:
189a Spikelet awned, awn geniculate or bent and lower part usually twisted.....**Merxmuellera**
189b Spikelet awned or awnless, awn straight:
190a Glumes very unequal in size, shorter than spikelet; lemma glabrous (but enveloped by long hairs from callus); mature inflorescence branches flexible, usually drooping.....**Phragmites**
190b Glumes ± equal in size, as long as spikelet; lemma long-hairy; mature inflorescence branches stiff and ascending .....*Arundo**
188b Plants not reed-like:
191a Lemma with an incurved, emarginate apex and a narrow, awned lobe at each margin, sometimes with 1 or 2 shorter, additional lobes, lateral awns long.....**Kaokochloa**
191b Characters not as for *Kaokochloa*:
192a Central awn of lemma geniculate or bent, lower part usually twisted:
193a Spikelet 4.0–7.0 mm long .....**Karroochloa**
193b Spikelet 7.5–25.0 mm long:
194a Glumes prominently 7–11-nerved; callus obliquely pungent.....**Centropodia**
194b Glumes 1–5(–7)-nerved; callus rounded:
195a Glumes 1-keeled to middle or below; palea similar in texture to lemma.....**Merxmuellera**
195b Glumes rounded, flat or with more than 1 keel; palea thinner in texture than lemma.....**Dregeochloa**
192b Central awn of lemma short and straight, or lemma shortly mucronate or awnless:
196a Leaves hard, needle-like; plants prickly:
197a Central axis of inflorescence usually ending in a spine, not in spikelets, lateral branches distant as rigid spines or in clusters scattered up central axis.....**Cladorhaphis**
197b Central axis of inflorescence ending in spikelets, dense and contracted:
198a Glumes very unequal in size, 1-nerved; lemma mucronate or with a short stout awn; long hairs on nerves.....**Odyssea**
198b Glumes ± equal in size, 5–11-nerved; lemma 3-awned; tufts of hairs on lemma and scattered hairs between nerves .....**Centropodia**
196b Leaves not needle-like; plants not prickly:
199a Lemma glabrous:
200a Upper glume 1-nerved:
201a Glumes as long as to longer than spikelet .....**Dinebra**
201b Glumes shorter than spikelet:

202a Inflorescence a large, plumose panicle; lemma apex appears awn-like..... ..... ***Cortaderia**

202b Inflorescence various, not large and plumose; lemma with true awn or awnless:

203a Upper glume and lemmas with stout awn; spikelets secund, if spikelets not secund see *Eragrostis* ..... **Acrachne**

203b Upper glume awnless, lemmas awned, mucronate or awnless; spikelets secund or not secund:

204a Inflorescence branches not one-sided; spikelets not secund..... **Eragrostis**

204b Inflorescence with many spike-like, one-sided racemes spreading from central axis (like a herringbone); spikelets secund..... **Pogonarthria**

200b Upper glume 3–7-nerved:

205a Lemma entire ..... **Eragrostis**

205b Lemma lobed or notched (sometimes minutely so):

206a Ligule a fringe of hairs; lower glume 5–7-nerved..... **Schismus**

206b Ligule a fringed membrane; lower glume 1–3-nerved..... **Brachychloa**

199b Lemma hairy or long-ciliate:

207a Ligule a fringe of hairs:

208a Lemma entire:

209a Inflorescence large, plumose; lemma with long fine hairs at base reaching ± to apex of body of lemma ..... ***Cortaderia**

209b Inflorescence not large and plumose; lemma without long hairs reaching to apex of body of lemma:

210a Lower glume 5–7-nerved (often best observed in lower part) ..... **Tribolium**

210b Lower glume 1–3-nerved (often best observed in lower part):

211a Lemma 6–11-nerved; spikelet spiny ..... **Entoplocamia**

211b Lemma 3–5-nerved; spikelet not spiny:

212a Lowest florets bisexual, complete; lemma 3-nerved..... **Eragrostis**

212b Lowest 2 florets reduced to lemmas; lemma 5-nerved..... **Tetrachne**

208b Lemma incised, emarginate to deeply lobed:

213a Glumes unequal in size:

214a Lemma hairs short or stiff, and not obvious or glabrous..... **Eragrostis**

214b Lemma distinctly hairy, hairs long, usually soft:

215a Plant base hard, dense and fibrous; lemma not deply lobed, with hairs on margin near base, sometimes lateral nerves with short appressed hairs ..... **Styppeiochloa**

215b Plant without fibrous base; lemma deeply lobed, with long hairs from apex to base on lateral nerves..... **Triraphis**

213b Glumes ± equal in size:

216a Lemma deeply cleft:

217a Glumes shorter than spikelet; lemma 3-nerved..... **Triraphis**

217b Glumes as long as to longer than glumes; lemma 7–11-nerved:

218a Callus rounded ..... **Merxmuellera**

218b Callus pungent ..... **Centropodia**

216b Lemma not deeply cleft:

219a Lemma 3-nerved ..... **Eragrostis**

219b Lemma 5–11-nerved:

220a Lemma 1.8–3.0 mm long, not deeply lobed..... **Schismus**

220b Lemma 5–16 mm long, usually deeply lobed ..... **Merxmuellera**

207b Ligule a fringed membrane:

221a Lemma 3-awned, awns of lobes obvious..... **Triraphis**

221b Lemma awnless, mucronate or 1-awned, entire or lobed, awns on lobes minute:

222a Lowest lemma awned, central awn more than twice as long as body of lemma ..... **Chloris**

222b Lowest lemma awnless, mucronate or awned, awn less than twice as long as body of lemma:

223a Upper glume 1-nerved:

224a Lemma saccate at base, hairs club-shaped; spikelet laterally compressed; palea shorter than lemma ..... **Coelachyrum**

224b Lemma not saccate at base, hairs acute; spikelet dorsiventrally compressed (± terete); palea ± equal to lemma..... **Leptochloa**

223b Upper glume 3–7-nerved (often clearer on inner surface):

225a Lemma 3-nerved..... **Brachychloa**

225b Lemma 5–9-nerved..... **Tribolium**

Acrachne Wight & Arn. ex Chiov. 9903311

(Chloridoideae—Eragrostideae—Eleusininae)

Chiovenda: 361 (1907); Chippindall: 132 (1955); Pilger: 29 (1956); Launert: 18 (1970a); Phillips: 258 (1974); Clayton & Renvoize: 222 (1986); Gibbs Russell *et al.*: 31 (1990); Watson & Dallwitz: 68 (1994).

Annual, tufted. **Leaf blade** broadly linear, tapering to hair-like tip, expanded, soft; *ligule* a fringed membrane to a fringe of hairs. **Inflorescence** of 5–10 spike-like racemes, digitate or subdigitate or along central axis, 1-sided; *spikelets* solitary. **Spikelet** oblong with serrated outline, laterally compressed, lemmas disarticulating from below, leaving palea and rachilla, or spikelets falling entire or in parts; *glumes* ± equal, similar, shorter than spikelet, membranous; lower glume ovate-lanceolate, 1-nerved, with nerve mucronate, keeled, scabrid on keel; upper glume lanceolate, awned. **Florets** 8–20, bisexual, upper reduced; *lemmas* ± similar, ovate, similar to, to firmer in texture than glumes, membranous, glabrous, keeled, keel scabrid above, deeply concave, shortly 2-lobed, 3-nerved, central nerve produced into an awn; *awn* short, 0.3–0.9 mm long, stout, straight; *callus* 0; *palea* as long as lemma, lanceolate, 2-keeled, deeply channelled between keels. **Lodicules** 2, small, cuneate, glabrous. **Stamens** 3. **Ovary** ellipsoid, glabrous; styles distinct, plumose. **Caryopsis** ellipsoid, surface with ornamentation; pericarp free. $x = 9$ (1 report).

Species 3, Africa, SE Asia and Australia; 1 in sthn Afr.: *Acrachne racemosa* (Roem. & Schult.) Ohwi, Namibia, Northern Province, Mpumalanga and Swaziland.

Acroceras Stapf 9901121

(Panicoideae—Paniceae—Setariinae)

Stapf: 621 (1920); Chippindall: 385 (1955); Launert: 19 (1970a); Clayton & Renvoize: 831 (1982); Clayton & Renvoize: 363 (1986); Clayton: 48 (1989); Gibbs Russell *et al.*: 353 (1990); Watson & Dallwitz: 71 (1994).

Perennial, caespitose and rhizomatous, usually with long prostrate base. **Leaf blade** expanded; *ligule* a narrow, fringed membrane or fringe of hairs. **Inflorescence** of a number of 1-sided, spike-like racemes scattered on a central axis, sometimes a panicle; *spikelets* usually in pairs, pedicelled, pedicels of each pair ± connate below. **Spikelet** oblong, laterally compressed or dorsiventrally or plumply subterete; upper glume and lower lemma ± thickened at apex; *glumes* unequal in size, similar, membranous; lower glume lanceolate, 3-nerved, shorter than spikelet; upper glume longer than spikelet, 5–7-nerved. **Florets** 2; *lower floret* male or sterile; lemma similar to upper glume, 5–7-nerved, awnless; palea developed, hyaline; *upper floret* bisexual; *lemma* firmer than glumes, crustaceous, oblong, very obscurely keeled or rounded on back, faintly 5-nerved, glabrous and shiny; tip with distinct green crest, hard and blunt, awnless; *palea* similar to lemma. **Lodicules** 2, cuneate, fleshy. **Stamens** 3. **Ovary** ellipsoid, glabrous; styles large, plumose. **Caryopsis** ellipsoid, flattened on one side. $x = 9$ (polyploidy).

Species ± 19, Africa, Madagascar and Indomalayan region; 1 in sthn Afr.: *Acroceras macrum* Stapf, N Namibia, Botswana, northern provinces of South Africa, KwaZulu-Natal and Eastern Cape.

Agrostis L. 9902430

(Pooideae—Aveneae—Alopecurinae)

Linnaeus: 61 (1753); Stapf: 545 (1899); Goossens & Papendorf: 172 (1945); Chippindall: 96 (1955); Launert: 20 (1970a); Clayton: 104 (1970); Launert: 86 (1971); Clayton & Renvoize: 134 (1986); Gibbs Russell *et al.*: 32 (1990); Rugolo de Agrasar & Molina: 179 (1992); Watson & Dallwitz: 83 (1994).

Annual or perennial, tufted or decumbent, often rooting at lower nodes, sometimes stoloniferous or rhizomatous. **Leaf blade** narrow, linear, expanded, rarely folded; *ligule* an unfringed membrane. **Inflorescence** a panicle, open or contracted, rarely spike-like, primary branches often fascicled on central axis; *spikelets* solitary, pedicelled. **Spikelet** up to ± 5 mm long, laterally compressed, linear-lanceolate to oblong, small, often gaping, disarticulating above glumes, rachilla sometimes produced, rarely bearing rudiment of a second floret; *glumes* ± equal, as long as to longer than spikelet, similar in form, membranous, acuminate or acute, 1-nerved, keeled, awnless to rarely awned. **Floret** 1, bisexual; *lemma* lanceolate or linear, less firm than glumes, thinly membranous to hyaline, hairy or glabrous, not keeled, 3–5-nerved, side nerves sometimes excurrent into mucros, awnless or awned from back below apex or from base, awn short, not extending beyond glumes; *palea* usually shorter than lemma, sometimes reduced or 0, 2-nerved or nerveless, thinly membranous, hyaline; *callus* small, glabrous or shortly pubescent with hairs up to half as long as lemma. **Lodicules** 2, lanceolate or oblong, hyaline. **Stamens** 3. **Ovary** ellipsoid; styles very short; stigma plumose. $x = 7$ (aneuploids, high polyploidy).

Species ± 220, temperate regions throughout the world, and on mountains in the tropics; ± 12 (2 naturalised) in sthn Afr., widespread, but generally absent from the dry central regions.

***Aira** L. 9901850

(Pooideae—Aveneae—Aveninae)

Linnaeus: 63 (1753); Stapf: 463 (1899); Chippindall: 86 (1955); Clayton: 84 (1970); Launert: 79 (1971); Tutin: 227 (1980); Clayton & Renvoize: 131 (1986); Gibbs Russell *et al.*: 35 (1990); Watson & Dallwitz: 85 (1994).

Annual, small, tufted. **Leaf blade** expanded or folded, almost filiform; *ligule* a hyaline, unfringed membrane. **Inflorescence** a panicle, open or rarely contracted, primary branches often paired; *spikelets* solitary, pedicelled. **Spikelet** small, shorter than 4 mm, laterally compressed, disarticulating above glumes; *glumes* persistent, ± equal, similar, ± as long as spikelet, ovate or elliptic, delicately membranous, acute, keeled, 1-nerved, awnless. **Florets** 2, bisexual; *lemma* firmer than glumes, lanceolate or ovate-lanceolate, rounded on back, obscurely 5-nerved, glabrous or hairy with hairs sometimes in tufts, acute, sometimes acuminate, often minutely 2-lobed, dorsally awned from below middle or awnless, *awn* geniculate or slightly bent, sometimes upper lemma awned and lower awnless; *palea* slightly shorter than lemma, narrow, 2-lobed, membranous or subhyaline. **Lodicules** 2, delicate. **Stamens** 3. **Ovary** glabrous; styles plumose. **Caryopsis** ellipsoid. $x = 7$ (polyploidy).

Species 8, Europe and Mediterranean to Iran; most species widespread weeds; 2 in sthn Afr., Free State, Drakensberg area of KwaZulu-Natal to southern and southwestern regions of the Cape.

Alloteropsis J.Presl 9900940

(Panicoideae—Paniceae—Setariinae)

Presl: 343 (1830); Stapf: 482 (1919); Chippindall: 423 (1955); Butzin: 123 (1968); Clayton & Renvoize: 615 (1982); Clayton & Renvoize: 282 (1986); Clayton: 58 (1989); Gibbs Russell *et al.*: 36 (1990); Watson & Dallwitz: 91 (1994).

Annual or perennial, tufted or decumbent. **Leaf blade** expanded or ± convolute, linear to lanceolate, glabrous or hairy with tubercle-based hairs; *ligule* a fringed membrane or a fringe of hairs. **Inflorescence** of spike-like, 1-sided racemes, digitate or subdigitate, usually on a short central axis; *spikelets* 2- or 3-nate, rarely solitary or in clusters, unequally pedicelled. **Spikelet** falling with glumes, ovate to elliptic, dorsiventrally compressed; *glumes* unequal; lower glume shorter than spikelet, membranous, acute to acuminate, pubescent, 3–5-

nerved, usually awnless; upper glume equalling lemma, elliptic, sometimes with broad auricled flaps, membranous to chartaceous, 5-nerved, hairy on margins. **Florets** 2; *lower floret* male or sterile, lemma resembling upper glume but not hairy, indurated, 3–5-nerved; palea shorter than lemma, deeply 2-lobed with marginal flaps, awnless; *upper floret* bisexual, *lemma* similar in texture to glumes, membranous to chartaceous, margins flat and exposed on palea, covering most of palea, 5-nerved, long attenuate into an awn or mucro, *awn* straight; *palea* as long as lemma, 2-keeled. **Lodicules** 2, broadly cuneate. **Stamens** 3. **Ovary** glabrous; styles plumose above. **Caryopsis** ellipsoid to oblong. $x = 9$ (polyploidy).

Species ± 8, Old World tropics; 3 in sthn Afr., Namibia (Caprivi), northern provinces of South Africa, Swaziland, Free State, KwaZulu-Natal and Eastern Cape.

*Ammophila Host 9902560

(Pooideae—Aveneae—Alopecurinae)

Host: 24 (1809); Chippindall: 93 (1955); Clayton & Renvoize: 136 (1986); Gibbs Russell *et al.*: 38 (1990); Watson & Dallwitz: 97 (1994).

Perennial, tufted, long rhizomatous; culms creeping extensively and rooting from lower nodes. **Leaf blade** rigid, convolute, pungent; *ligule* an unfringed membrane. **Inflorescence** a dense, spike-like panicle, cylindrical; *spikelets* sessile or shortly pedicelled. **Spikelet** strongly laterally compressed, disarticulating above glumes, rachilla extension present; *glumes* 10 mm and longer, ± equal to, to longer than spikelet, keeled, acute, awnless; lower glume 1-nerved; upper glume 1–3-nerved. **Floret** 1, bisexual; *lemma* lanceolate, similar in texture to glumes, glabrous, keeled, 5–7-nerved, 2-lobed with subapical mucro; *callus* short, hairy; *palea* almost equalling lemma, 2–4-nerved. **Lodicules** 2. **Stamens** 3. **Ovary** glabrous. **Caryopsis** ellipsoid. $x = 7$ (high polyploidy).

Species 2, north temperate; 1 naturalised in sthn Afr.: **Ammophila arenaria* (L.) Link, used for reclamation work on sand dunes in southern Cape region.

Andropogon L. 9900710

(Panicoideae—Andropogoneae—Andropogoninae)

Linnaeus: 1045 (1753); Stapf: 334 (1898); Chippindall: 495 (1955); Anderson: 5 (1966); Clayton & Renvoize: 767 (1982); Clayton & Renvoize: 349 (1986); Gibbs Russell *et al.*: 38 (1990); Watson & Dallwitz: 109 (1994).

Diectomis Kunth: 69 (1815) name conserved, not of P.Beauv.; Chippindall: 504 (1955).

Perennial, rarely annual, tufted, rarely straggling, sometimes rhizomatous. **Leaf blade** linear, never aromatic; *ligule* an unfringed to fringed membrane. **Inflorescence** of spike-like racemes, usually paired or digitate, rarely solitary, terminal or axillary and crowded into a spatheate false panicle, internodes filiform, linear to ovoid or clavate, raceme-bases unequal, ± terete, racemes not deflexed at maturity; *spikelets* paired, in long-short combinations: one sessile, the other pedicelled. **Sessile spikelet** (2 or 3)5–11 mm long, dorsiventrally or laterally or not noticeably compressed, falling with glumes; *glumes* ± equal, dissimilar, glabrous or hairy; lower glume indurated, flat, shallowly furrowed or deeply grooved on back, sometimes pitted, 2-keeled, keels lateral or dorsal, wingless or narrowly winged, margins folded; upper glume keeled upwards, awnless, mucronate or awned. **Florets** 2; *lower floret* reduced to a lemma, hyaline, 2-nerved, awnless; *upper floret* bisexual, *lemma* less firm in texture than glumes, membranous or firm, 2-lobed, awned from sinus, *awn* geniculate, conspicuous with a glabrous or hairy column, sometimes entire and awnless; *callus* obtuse, short, inserted in concave top of internode; *palea* hyaline, nerveless, scale-like or 0. **Lodicules** 2, minute. **Stamens** 1–3. **Ovary** glabrous; styles plumose. **Caryopsis** narrowly lanceolate to oblong, subterete to plano-convex.

Pedicelled spikelet more conspicuous than sessile spikelet, occasionally suppressed, male or barren, usually awnless. $x = 5, 10$ (high polyploidy).

Species ± 100, pantropical; 15 in sthn Afr., widespread.

Anthephora Schreb. 9901380

(Panicoideae—Paniceae—Cenchrinae)

Schreber: 105 (1810); Stapf: 440 (1899); Goossens: 189 (1932); Chippindall: 436 (1955); Launert: 23 (1970a); Clayton & Renvoize: 660 (1982); Clayton & Renvoize: 306 (1986); Clayton: 190 (1989); Gibbs Russell *et al.*: 42 (1990); Watson & Dallwitz: 119 (1994).

Perennial or annual, tufted; culm erect or geniculate. **Leaf blade** linear, expanded or folded; *ligule* an unfringed membrane. **Inflorescence** spike-like, cylindrical, rachis 3-angled, wavy, composed of sessile clusters formed by 3–11 *spikelets*, inner fertile spikelets enclosed in an outer involucre of several glumaceous or coriaceous bracts or of lower glumes of vestigial sterile spikelets, these are usually connate at base, clusters disarticulating as a whole from persistent main axis. **Involucre spikelet**: lower glume acute, acuminate or drawn out into short rigid sometimes bifid awn, 2–13-nerved with nerves visible on inside, indurated. **Fertile spikelet** lanceolate to oblong, dorsiventrally compressed; *glumes* dissimilar; lower glume suppressed; upper glume shorter than spikelet, 1-nerved. **Florets** 2; *lower floret* reduced to a lemma shorter than spikelet, membranous, 2–7-nerved; *upper floret* bisexual, *lemma* lanceolate, membranous, entire, glabrous, 3–5-nerved, flat, thin margins covering most of palea, awnless; *palea* similar to lemma, 2-nerved. **Lodicules** 2. **Stamens** 3. **Ovary** lanceolate-oblong; styles plumose. **Caryopsis** oblong-ellipsoid, dorsiventrally compressed. $x = 9$ (polyploidy).

Species 12, tropical and sthn Afr., Arabia and tropical America; 4 in sthn Afr., Namibia, Botswana, northern provinces of South Africa and Northern Cape.

Anthoxanthum L. 9901640

(Pooideae—Aveneae—Phalaridinae)

Linnaeus: 28 (1753); Stapf: 465 (1899); Chippindall: 90 (1955); Launert: 72 (1971); Tutin: 229 (1980); Clayton & Renvoize: 133 (1986); Gibbs Russell *et al.*: 43 (1990); Watson & Dallwitz: 121 (1994).

Annual or perennial, stoloniferous or rhizomatous, tufted to decumbent, sometimes aromatic. **Leaf blade** linear, expanded; *ligule* an unfringed membrane. **Inflorescence** a narrow, spike-like panicle; *spikelets* solitary, sessile or pedicelled. **Spikelet** moderately laterally compressed, disarticulating above glumes; *glumes* unequal, similar, membranous with hyaline margins, glabrous to hairy, awnless; lower glume 1–5-nerved; upper glume 3-nerved. **Florets** 3, *lower* 2 *florets* male or sterile with lower lemma(s) longer than uppermost lemma, membranous, hairy, 5–7-nerved, apex 2-lobed, lowest lemma with a short straight *awn* from above middle of back, second lemma awned from near base, *awn* geniculate; *uppermost floret* bisexual, *lemma* glabrous, awnless; *palea* without keels, usually 1-nerved. **Lodicules** 0. **Stamens** 2 or 3(rarely). **Ovary** glabrous; styles long, plumose. $x = 5$ (polyploidy).

Species ± 20, north temperate and mountains of tropical Africa and Asia; ± 4 in sthn Afr. (1 naturalised), Mpumalanga, Free State, KwaZulu-Natal, Lesotho, Eastern and Western Cape.

Aristida L. 9902620

(Arundinoideae—Aristideae)

Linnaeus: 82 (1753); Stapf: 551 (1899); Henrard: 1 (1926–1933); Henrard: 45 (1929–1933); Chippindall: 291 (1955); De Winter: 234 (1965); Clayton: 140 (1970); Launert: 25 (1970a); Melderis: 97 (1971); Clayton & Renvoize: 186 (1986); Gibbs Russell *et al.*: 45 (1990); Watson & Dallwitz: 134 (1994).

Annual or perennial, tufted, rhizomatous, sometimes geniculate. **Leaf blade** linear, expanded or folded; *ligule* a dense fringe of hairs. **Inflorescence** a panicle, open to contracted, sometimes spike-like; *spikelets* solitary, pedicelled. **Spikelet** disarticulating above glumes; *glumes* unequal to ± equal, equal to longer than spikelet (at least one glume), 1-keeled to middle or below, narrow, awnless to mucronate or awned; lower glume 1-nerved; upper glume 1(–3)-nerved. **Floret** 1, bisexual; *lemma* firmer than glumes, indurated, cylindrical, dorsally or laterally compressed, margins involute, forming a ventral groove, 3-nerved, 3-awned; *awns* usually fused to appear as 1 awn with 3 branches, lateral awns sometimes reduced or 0, glabrous or scabrid, never hairy, column present or 0, long or short and twisted, articulation various: between apex of column and base of awns, between apex of lemma and base of column or 0; *callus* usually well developed, obtuse, truncate, acute to pungent, bifid, or emarginate, hairy, usually with short stiff hairs; *palea* usually half as long as lemma, not indurated, nerveless, or 2-nerved, margins curved inwards. **Lodicules** 2 or 0. **Stamens** 1 or 3. **Ovary** glabrous; styles plumose. **Caryopsis** terete, shallowly grooved. $x = 11, 12$ (polyploidy).

Species ± 290, tropics and subtropics; 28 in sthn Afr., widespread.

*Arrhenatherum P.Beauv. 9902000

(Pooideae—Aveneae—Aveninae

Palisot de Beauvois: 152 (1812); Chippindall: 81 (1955); Holub: 216 (1980); Clayton & Renvoize: 124 (1986); Gibbs Russell *et al.*: 55 (1990); Watson & Dallwitz: 136 (1994).

Perennial, tufted. **Leaf blade** expanded; *ligule* an unfringed membrane. **Inflorescence** a narrow panicle, branches arranged in rather remote whorls; *spikelets* pedicelled. **Spikelet** 7–11 mm long, laterally compressed, disarticulating above glumes, florets falling together; *glumes* unequal, shorter to ± as long as spikelet, similar, shining, awnless; lower glume 1-nerved; upper glume 3-nerved. **Florets** 2(–rarely 5), with or without rachilla prolonged and rudimentary floret; *lowest* or *lower florets* usually male, rarely bisexual, 5–9-nerved, glabrous or hairy, stoutly awned from lower third of back, awn geniculate, longer than body of lemma; *upper floret* bisexual, *lemma* firmer in texture than glumes, 5–7-nerved, glabrous to hairy, rounded on back, entire or shortly 2-lobed, awned from middle or upper third of back, *awn* straight; *callus* short, hairy; *palea* shorter than corresponding lemma, shortly bidentate at apex, ciliate on keels. **Lodicules** 2, membranous. **Stamens** 3. **Ovary** ellipsoid, hairy; styles plumose. **Caryopsis** ellipsoid, hairy. $x = 7$ (polyploidy).

Species ± 6, Europe, Mediterranean and Middle East; 1 naturalised in sthn Afr.: **Arrhenatherum elatius* (L.) Presl, introduced and cultivated to a limited extent, occasionally found as an escape in parts of KwaZulu-Natal.

Arthraxon P.Beauv. 9900670

(Panicoideae—Andropogoneae—Andropogoninae)

Palisot de Beauvois: 111 (1812); Stapf: 162 (1917); Van Welzen: 255 (1981); Clayton & Renvoize: 741 (1982); Clayton & Renvoize: 353 (1986); Gibbs Russell *et al.*: 56 (1990); Watson & Dallwitz: 138 (1994).

Perennial or annual, often trailing. **Leaf blade** linear-lanceolate to ovate-lanceolate, cordate and amplexicaul at base; *ligule* an unfringed to fringed membrane (rarely). **Inflorescence** of slender racemes, subdigitate, internodes and pedicels filiform to linear; *spikelets* usually paired, secund, in long-short combinations: one sessile, the other pedicelled, pedicels free from rachis. **Sessile spikelet** laterally compressed, falling with glumes; *glumes* ± equal in size, dissimilar, awnless; lower glume rounded on back, with or without 2 lateral keels, spinously muricate; upper glume laterally compressed. **Florets** 2; *lower floret* sterile, reduced to a hyaline lemma, awnless; *upper floret* bisexual, *lemma* less firm than glumes, hyaline, awned from low down on back, *awn* glabrous, geniculate; *callus* truncate, inserted into hollow top of internode; *palea* reduced or 0. **Lodicules** 2, fleshy, glabrous. **Stamens** 2 or 3. **Ovary** glabrous. **Caryopsis** terete.

Pedicelled spikelet variable in form, male, sterile or vestigial. $x = 9$ (polyploidy).

Species ± 7, Old World tropics, but mainly in India; 1 in sthn Afr.: *Arthraxon lanceolatus* (Roxb.) Hochst. var. *lanceolatus*, Mpumalanga.

Arundinella Raddi 9901730

(Panicoideae—Arundinelleae)

Raddi: 37 (1823); Stapf: 448 (1899); Chippindall: 275 (1955); Clayton: 121 (1967b); Hubbard: 407 (1974); Clayton & Renvoize: 316 (1986); Clayton: 199 (1989); Gibbs Russell *et al.*: 56 (1990).

Perennial, tufted, rhizomatous. **Leaf blade** linear, expanded; *ligule* a fringed membrane. **Inflorescence** an oblong panicle, open or contracted; *spikelets* solitary and shortly pedicelled or usually paired and unequally pedicelled with both spikelets alike or shorter-pedicelled spikelet sterile and reduced to a glume. **Spikelet** lanceolate, laterally compressed, disarticulating beneath upper floret; *glumes* very unequal: lower glume acute to mucronate, 3-nerved; upper glume as long as spikelet, acuminate, 5-nerved. **Florets** 2; *lower floret* male, rarely sterile or bisexual with lemma membranous, falcate, 3–7-nerved, obtuse, awnless, palea hyaline; *upper floret* bisexual, lemma similar to firmer in texture than glumes, glabrous, scabrid to scaberulous, 1–7-nerved, minutely 2-lobed at apex, rarely entire, lobes sometimes produced into short hair-like bristles, awned from between lobes, *awn* geniculate; *callus* short, hairy; *palea* 2-keeled. **Lodicules** 2, cuneate, fleshy. **Stamens** 3. **Ovary** oblong, glabrous; styles distinct or connate at base, plumose. **Caryopsis** oblong. $x = 7, 10, 12, 14$ (high polyploidy).

Species ± 50, tropics and subtropics but mainly Asia; 1 in sthn Afr.: *Arundinella nepalensis* Trin., from northern provinces of South Africa, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

*Arundo L. 9902130

(Arundinoideae—Arundineae)

Linnaeus: 81 (1753); Tutin: 252 (1980); Clayton & Renvoize: 181 (1986); Gibbs Russell *et al.*: 57 (1990); Watson & Dallwitz: 145 (1994).

Perennial, tall reed, long rhizomatous. **Leaf blade** linear-lanceolate to lanceolate, expanded, deciduous at base of blade, leaves cauline; *ligule* a short fringed membrane, hairs shorter than subtending membrane. **Inflorescence** a large, plumose panicle, 300–600 mm long, branches stiff and ascending; *spikelets* pedicelled. **Spikelet** laterally compressed, disarticulating above glumes; *glumes* ± equal, ± as long as spikelet, membranous, 3–5-nerved, awnless. **Florets** 2–7, bisexual or *uppermost floret* reduced; *lemma* similar to less firm in texture to glumes, not becoming indurated, hyaline or membranous, long-hairy, 3–9-nerved, awned; *awn* straight, shorter than body of lemma; *callus* short, blunt, hairy; *palea* present, shorter than lemma, 2-nerved. **Lo-**

dicules 2, fleshy, glabrous. **Stamens** 3. **Ovary** glabrous. $x = 12$ (aneuploids, high polyploidy).

Species 3, Mediterranean to China, widely introduced elsewhere; 1 naturalised and cultivated in sthn Afr.: **Arundo donax* L., widespread.

*Avena L. 9901950

(Pooideae—Aveneae—Aveninae)

Linnaeus: 83 (1753); Stapf: 477 (1899); Chippindall: 80 (1955); Baum: 12 (1968); Launert: 74 (1971); Baum: 1 (1977); Rocha Afonso: 206 (1980); Hubbard: 81 (1970); Clayton & Renvoize: 124 (1986); Gibbs Russell *et al.*: 58(1990); Watson & Dallwitz: 158 (1994).

Annual. **Leaf blade** linear, expanded, flaccid; *ligule* an unfringed membrane. **Inflorescence** an open panicle; *spikelets* pedicelled, pendulous. **Spikelet** large, 7–46 mm long, laterally compressed, disarticulating above glumes, sometimes between florets (persistent in cultivated forms); *glumes* persistent, ± equal, usually as long as to longer than spikelet, similar, membranous, margin hyaline, rounded on back, 3–11-nerved, apex acute to acuminate, awnless. **Florets** 2–several; *lower* (1)2–6 *florets* bisexual; *upper florets* ± reduced; *lemma* similar in texture to glumes, membranous when immature, later becoming indurated, hairy to glabrous, 5–9-nerved, not keeled, 2-lobed, lobes awned or awnless, *awn* dorsal, or absent in some species and cultivars, inserted at middle or higher, geniculate, longer than body of lemma, twisted below, rarely straight; *callus* short, obtuse to acute, usually hairy; *palea* shorter than lemma, 2-keeled, 2-nerved, membranous. **Lodicules** 2, relatively large. **Stamens** 3. **Ovary** densely pilose; styles short, plumose. **Caryopsis** oblong to ellipsoid, hairy or glabrous. $x = 7$ (high polyploidy).

Species ± 25, mainly Mediterranean and Middle East; 5 naturalised in sthn Afr., not in Namibia and Botswana, mainly escapes from cultivation.

*Axonopus P.Beauv. 9901050

(Panicoideae—Paniceae—Setariinae)

Palisot de Beauvois: 12 (1812); Stapf: 417 (1899); Stapf: 566 (1919); Clayton & Renvoize: 613 (1982); Clayton & Renvoize: 289 (1986); Clayton: 91 (1989); Gibbs Russell *et al.*: 59 (1990); Watson & Dallwitz: 160 (1994).

Perennial, tufted, stoloniferous. **Leaf blade** somewhat linear, expanded or folded, apex abruptly rounded; *ligule* a narrow, fringed membrane. **Inflorescence** of 2–many slender racemes, digitate or subdigitate; *spikelets* solitary, subsessile, alternating on one side of 3-angled rachis, back of upper lemma turned away from rachis. **Spikelet** lanceolate to oblong, dorsiventrally compressed, falling with glumes; *glumes* unequal, awnless; lower glume absent; upper glume membranous, as long as spikelet, 4- or 5-nerved. **Florets** 2; *lower floret* sterile, with lemma similar to upper glume; palea 0; *upper floret* bisexual, *lemma* firmer than glumes, chartaceous to crustaceous, as long as spikelet, obtuse, 4-nerved, glabrous, entire, with back turned away from rachis, margins narrow, inrolled and covering only edges of palea, awnless; *palea* equal or subequal to lemma, indurated. **Lodicules** 2, minute, broadly cuneate. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose. **Caryopsis** ellipsoid, dorsiventrally compressed. $x = 10$ (high polyploidy).

Species 110, tropical and subtropical America; 1 naturalised in Africa: **Axonopus affinis* Chase, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

*Bambusa Schreb. 9904710

(Bambusoideae—Bambuseae—Bambusinae)

Schreber: 236 (1789) name conserved; Clayton & Renvoize: 53 (1986); Gibbs Russell *et al.*: 60 (1990); Watson & Dallwitz: 161 (1994).

Perennial, sympodial, woody; culm sheath blades very broad. **Leaf blade** pseudopetiolate, disarticulating from sheaths; *ligule* unfringed to a fringed membrane. **Inflorescence** a panicle of 1–many *pseudospikelets* in globose clusters, sessile on nodes. **Spikelet** disarticulating above glumes; *glumes* 1–3, ± equal, shorter than adjacent lemma. **Florets** 1–many, bisexual; *lowermost florets* sometimes sterile; *lemma* 9–22-nerved, awnless; *palea* 2-keeled with several nerves. **Lodicules** 3, membranous. **Stamens** 6. **Ovary** hairy with conspicuous, broadly conical and fleshy appendage; stigmas usually 3. $x = 12$ (aneuploids, polyploidy).

Species ± 120, tropical Asia and America; 1 naturalised and cultivated in sthn Afr.: **Bambusa balcooa* Roxb. ex Roxb., Northern Province, Mpumalanga, KwaZulu-Natal and Eastern Cape. Flowering rare and sporadic.

Bewsia Gooss. 9903442

(Chloridoideae—Eragrostideae—Eleusininae)

Goossens: 183 (1941); Chippindall: 121 (1955) under *Diplachne* P.Beauv.; Clayton: 286 (1974); Clayton & Renvoize: 212 (1986); Gibbs Russell *et al.*: 61 (1990); Watson & Dallwitz: 168 (1994).

Perennial, tufted, rhizomatous. **Leaf blade** linear to linear-lanceolate, expanded or rolled; *ligule* an unfringed membrane. **Inflorescence** of spike-like racemes scattered on and appressed to central axis; *spikelets* solitary, shortly pedicelled. **Spikelet** 5.5–9.0 mm long, weakly laterally compressed, disarticulating above glumes and not between florets; *glumes* ± equal, shorter than spikelet, similar, 1-nerved, acuminate, awnless. **Florets** 2–6, bisexual, but *uppermost floret* reduced; *lemma* similar in texture to glumes, membranous, lightly keeled, 3-nerved, hairy on lateral nerves, entire or incised, awned from back below apex, *awn* straight, shorter to, to as long as body of lemma; *callus* short, blunt, densely hairy; *palea* as long as lemma, hairy. **Lodicules** 2, long and narrow, glabrous. **Stamens** 3. **Ovary** glabrous. **Caryopsis** linear-oblong. $x = 10$ (1 report).

Species 1, Africa: *Bewsia biflora* (Hack.) Gooss., N Namibia, northern provinces of South Africa, Swaziland, Free State and KwaZulu-Natal.

Bothriochloa Kuntze 9900630

(Panicoideae—Andropogoneae—Sorghinae)

Kuntze: 762 (1891); Stapf: 344 (1898); Chippindall: 482 (1955); Clayton & Renvoize: 719 (1982); Clayton & Renvoize: 344 (1986); Gibbs Russell *et al.*: 62 (1990); Watson & Dallwitz: 175 (1994).

Perennial, tufted, sometimes decumbent or stoloniferous. **Leaf blade** linear, usually expanded; *ligule* an unfringed to a fringed membrane, often bearded at collar. **Inflorescence** of racemes, digitate, or subdigitate, or a panicle with a long central axis, or a spatheate, leafy false panicle (this may not be easily discernible), pedicels and internodes linear, longitudinally grooved with a translucent median line; *spikelets* usually paired, secund, in long-short combinations: one sessile, the other pedicelled, pedicels free from rachis. **Sessile spikelet** 3–4 mm long, dorsiventrally compressed, falling with glumes; *glumes* ± equal, dissimilar, firm to membranous; lower glume flattened on back, 2-keeled, sometimes with 1–3 pits in middle, hairy or glabrous, acute to subacute; upper glume distinctly keeled. **Florets** 2; *lower floret* sterile, reduced to hyaline lemma, awnless; *upper floret* bisexual, *lemma* less firm in texture than glumes, reduced to a hyaline stipe, glabrous, entire, awned, *awn* glabrous, geniculate, longer than body of lemma; *callus* short, rounded, hairy; *palea* reduced or 0. **Lodicules** 2. **Stamens** 3. **Ovary** ellipsoid, glabrous; styles plumose above. **Caryopsis** oblong, slightly dorsiventrally compressed.

Pedicelled spikelet symmetrical, same size or smaller than sessile spikelet, glabrous, sterile or male, awnless. $x = 10$ (high polyploidy).

Species ± 35, throughout the tropics; 3 in sthn Afr., widespread but not in the Western Cape.

Brachiaria (Trin.) Griseb. 9901040

(Panicoideae—Paniceae—Setariinae)

Trinius: 194 (1834); Grisebach: 496 (1853); Stapf: 383 (1898); Chippindall: 370 (1955); Clayton & Renvoize: 575 (1982); Clayton & Renvoize: 283 (1986); Webster: 15 (1987); Clayton: 62 (1989); Gibbs Russell *et al.*: 63 (1990); Morrone & Zuloaga: 43 (1992); Watson & Dallwitz: 179 (1994).

Pseudobrachiaria Launert: 158 (1970b); Launert: 156 (1970a).

Annual or perennial. **Leaf blade** linear to lanceolate; *ligule* unfringed or a fringed membrane or fringe of hairs, rarely absent on all or only upper leaves. **Inflorescence** of 1–many, usually 1-sided, spike-like racemes scattered up central axis, rarely spike-like or like a panicle, rachis 3-angled or flattened; *spikelets* solitary, paired or clustered, often sessile or pedicelled, often orientated with lower glume adjacent to rachis of raceme (adaxial). **Spikelet** not noticeably to dorsiventrally compressed, disarticulating with glumes or above them, ovate to oblong, plump, obtuse to acute, rarely softly long-hairy; *glumes* unequal in size, rarely ± equal, dissimilar, awnless; lower glume usually shorter than spikelet, membranous, obtuse at apex, 1–7-nerved; upper glume usually as long as spikelet and similar to lower lemma, acuminate, 5–11-nerved. **Florets** 2; *lower floret* male or sterile with lemma similar to upper glume, 5–7-nerved, palea shorter than lemma, membranous; *upper floret* bisexual, *lemma* firmer than glumes, crustaceous, faintly 5-nerved, glabrous, margins inrolled and covering only edges of palea, awnless; *palea* obtuse to subacute, firm with two marginal flaps at base. **Lodicules** 2, broadly cuneate. **Stamens** 3. **Ovary** ovoid; styles plumose above. **Caryopsis** ellipsoid, dorsiventrally compressed. $x = 7, 9$ (high polyploidy).

Species ± 100, tropics, mainly Old World; 21 in sthn Afr., widespread.

Brachyachne (Benth.) Stapf 9902970

(Chloridoideae—Cynodonteae—Chloridinae)

Stapf: 20 (1917); Stapf: t. 3099 (1922); Renvoize: 311 (1974); Clayton & Renvoize: 243 (1986); Gibbs Russell *et al.*: 69 (1990); Watson & Dallwitz: 181 (1994).

Perennial, tufted. **Leaf blade** linear, flat or rolled and filiform; *ligule* a fringed membrane to a fringe of hairs. **Inflorescence** a single, terminal, 1-sided spike, (rarely paired and digitate); *spikelets* solitary, subsessile, appressed to axis. **Spikelet** 3.0–4.4 mm long, often light golden brown, strongly laterally compressed, usually disarticulating above glumes, obtuse; *glumes* ± equal, longer than and enclosing spikelet, broad, dissimilar, keeled, 1-nerved, awnless. **Floret** 1, bisexual, with rachilla extension occasionally with a reduced lemma, lower *lemma* less firm to similar in texture to glumes, membranous to hyaline, hairy, 3-nerved, obtuse to truncate, awnless, rarely with a short mucro; *callus* hairy; *palea* ciliate along nerves. **Lodicules** 2, fleshy, glabrous. **Stamens** 3. **Ovary** glabrous. **Caryopsis** ovoid.

Species ± 10, Africa, Java to Australia; 1 in sthn Afr.: *Brachyachne patentiflora* (Stent & Rattray) C.E.Hubb., Namibia (Caprivi).

Brachychloa S.M.Phillips 9902864

(Chloridoideae—Eragrostideae—Eleusininae)

Phillips: 158 (1982); Clayton & Renvoize: 214 (1986); Gibbs Russell *et al.*: 69 (1990); Watson & Dallwitz: 182 (1994).

Heterocarpha Stapf & C.E.Hubb.: 263 (1929) in part; Schweickerdt: 193 (1961).

Perennial or annual, tufted or decumbent, stoloniferous. **Leaf blade** linear to almost lanceolate, rigid; *ligule* a short, truncate, fringed membrane. **Inflorescence** of racemes on a central axis, these long and deciduous or short, persistent and crowded into a loose head or spreading; *spikelets* solitary, pedicelled. **Spikelet** laterally compressed, lanceolate-oblong to ovate-oblong, disarticulating above glumes and between florets; *glumes* ± equal, shorter than spikelet, lateral to rachis, lanceolate, keeled, glabrous to minutely scaberulous; lower glume subcoriaceous, acute, awnless, sometimes mucronate, 1–3-nerved; upper glume coriaceous with margins membranous, 3–7-nerved, acuminate to shortly mucronate from between lobes. **Florets** 3–7, bisexual or *uppermost floret* reduced and sterile; *lemma* similar in texture to glumes, chartaceous, subobtuse to obtuse, lightly keeled with a single median keel, glabrous or hairy on margins, 3–7-nerved, nerves faint in upper half, 2-lobed, shortly mucronate; *callus* 0; *palea* shorter than lemma, slightly gibbous at base, lanceolate to ovate-lanceolate, 2-keeled. **Lodicules** 2, hyaline, minute. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose. **Caryopsis** ellipsoid or trigonous, with free pericarp.

Species 2, both in Mozambique and sthn Afr., KwaZulu-Natal.

Brachypodium P.Beauv. 9904320

(Pooideae—Triticeae)

Palisot de Beauvois: 100, 155 (1812); Stapf: 735 (1900); Chippindall: 68 (1955); Clayton: 71 (1970); Launert: 62 (1971); Smith: 189 (1980); Clayton & Renvoize: 149 (1986); Gibbs Russell *et al.*: 70 (1990); Watson & Dallwitz: 184 (1994).

Perennial or annual; tufted or decumbent, often rooting at nodes, often rhizomatous, sometimes wiry. **Leaf blade** linear, expanded or rolled; *ligule* an unfringed or fringed membrane. **Inflorescence** a raceme or sometimes reduced to 1–3 spikelets, spike-like or racemes scattered up central axis; *spikelets* solitary, pedicellate, alternating in 2 rows on opposite sides of tough rachis. **Spikelet** 10–44 mm long, slightly laterally compressed, disarticulating above glumes and between florets; *glumes* unequal to ± equal, shorter than spikelet, similar, rounded on back, obtuse to shortly awned or awnless, membranous; lower glume 5–7-nerved; upper glume 7–9-nerved. **Florets** 5–22, bisexual or *uppermost floret* sometimes reduced and sterile, densely imbricate at first; *lemma* similar in texture to glumes, rounded on back, glabrous, 7–9-nerved, entire, awned, *awn* straight, slender; *callus* short, obtuse, glabrous; *palea* slightly shorter than lemma, 2-keeled, pectinate-ciliate along keels. **Lodicules** 2, lanceolate, apex usually truncate. **Stamens** 3. **Ovary** hairy with villous appendage at apex; styles laterally inserted on appendage. $x = 5, 7, 9, 10$ (aneuploids, high polyploidy).

Species 16, temperate Eurasian, tropical mountains, Mexico to Bolivia; 3 in sthn Afr., northern provinces of South Africa, Free State, KwaZulu-Natal, Lesotho, S Northern, Western and Eastern Cape.

***Briza** L. 9904040

(Pooideae—Poeae)

Linnaeus: 70 (1753); Stapf: 707 (1900); Chippindall: 47 (1955); Launert: 45 (1971); Matthei: 1 (1975); Hubbard: 51 (1970); Tutin: 173 (1980); Clayton & Renvoize: 99 (1986); Gibbs Russell *et al.*: 72 (1990); Watson & Dallwitz: 185 (1994).

Annual or perennial, tufted. **Leaf blade** linear to linear-lanceolate, expanded; *ligule* an unfringed membrane. **Inflorescence** a panicle, open to loosely contracted; *spikelets* solitary, pedicelled. **Spikelet** laterally compressed or globose, ovate to rotund, disarticulating above glumes and between florets; *glumes* ± equal, shorter than spikelet, similar, 3–9-nerved, awnless. **Flo-**

rets many, bisexual; *upper floret* sometimes reduced, closely imbricate, *lemma* similar in texture to glume, papery with broad scarious margins all round, as broad as long, gibbous, cordate at base, not keeled, horizontally spreading, 7–9-nerved, obtuse to acuminate, 2-lobed, awnless or mucronate; *callus* short, glabrous; *palea* shorter than lemma, membranous, 2-keeled, keels often narrowly winged. **Lodicules** 2, small, glabrous. **Stamens** 3. **Ovary** glabrous. **Caryopsis** ellipsoid. $x = 5$, 7 (aneuploids, polyploidy).

Species ± 20, temperate Eurasia, South America; 3 naturalised in sthn Afr., widely distributed, not recorded from Namibia and Botswana.

Bromus L. 9904280

(Pooideae—Bromeae)

Linnaeus: 76 (1753); Stapf: 726 (1900); Chippindall: 62 (1955); Clayton: 66 (1970); Launert: 59 (1971); Pinto-Escobar: 9 (1976); Smith: 182 (1980); Clayton & Renvoize: 144 (1986); Linder: 61 (1986); Gibbs Russell *et al.*: 73 (1990); Watson & Dallwitz: 188 (1994).

Annual or perennial or short-lived perennial, tufted, sometimes rhizomatous, sometimes geniculate. **Leaf blade** linear, flat or rolled; *ligule* an unfringed membrane. **Inflorescence** a panicle, open or contracted, rarely reduced to a raceme; *spikelets* solitary, pedicelled. **Spikelet** laterally compressed to varying degree, disarticulating above glumes; *glumes* unequal, rarely ± equal, similar, shorter than spikelet, keeled or rounded on back, awnless; lower glume 1–7-nerved; upper glume 3–9-nerved. **Florets** 3–many (rarely 1 or 2), bisexual with *uppermost floret* reduced; *lemma* 5–15-nerved, keeled or rounded on back, entire or 2-lobed, awnless, mucronate or awned from sinus, *awn* straight, often stiff; *palea* as long as or slightly shorter than lemma, membranous, 2-nerved, 2-keeled, ciliate or pectinate along keels. **Lodicules** 2. **Stamens** 1–3. **Ovary** obovoid, hairy, with a conspicuous villous appendage at apex; styles 2, plumose. $x = 7$ (high polyploidy).

Species ± 150, mainly north temperate areas, tropical mountains, South America; ± 15 in sthn Afr., widespread.

Calamagrostis Adans. 9902460

(Pooideae—Aveneae—Alopecurinae)

Adanson: 31, 530 (1763); Stapf: 550 (1899); Chippindall: 94 (1955); Hubbard: 102 (1970); Clayton & Renvoize: 135 (1986); Gibbs Russell *et al.*: 76 (1990); Watson & Dallwitz: 195 (1994).

Perennial, robust, tufted, long-rhizomatous. **Leaf blade** expanded; *ligule* an unfringed membrane. **Inflorescence** a panicle, linear, usually rather narrow, contracted and dense; *spikelets* shortly pedicelled. **Spikelet** usually 5.5–8.0 mm long, laterally compressed, disarticulating above glumes, linear, narrow, acuminate; *glumes* subequal, linear-lanceolate, longer than spikelet, firmly membranous, keeled upwards, scaberulous, awnless; lower glume 1-nerved; upper glume 1–3-nerved. **Floret** 1, bisexual, *lemma* less firm to similar in texture to glumes, hyaline, glabrous, 3–5-nerved, truncate-denticulate or lobed, awned from back well below apex, *awn* short, fine and straight, not extending beyond glumes; *callus* hairy, hairs white, as long as or longer than lemma; *palea* as long as lemma or shorter, 2-nerved, hyaline. **Lodicules** 2, hyaline, glabrous. **Stamens** 3. **Ovary** glabrous; styles plumose. **Caryopsis** narrowly ellipsoid. $x = 7$ (high polyploidy).

Species ± 270, temperate regions of both hemispheres; 1 in sthn Afr.: *Calamagrostis epigejos* (L.) Roth var. *capensis* Stapf, North-West, Gauteng and Eastern Cape.

Catalepis Stapf & Stent 9902942

(Chloridoideae—Cynodonteae—Zoysiinae)

Stapf & Stent: 11 (1929); Chippindall: 207 (1955); Clayton & Renvoize: 252 (1986); Gibbs Russell *et al.*: 77 (1990); Watson & Dallwitz: 206 (1994).

Perennial, tufted, creeping, rhizomatous. **Leaf blade** linear, setaceous; *ligule* a fringe of hairs. **Inflorescence** a narrow, often 1-sided, spike-like panicle, rarely a raceme; *spikelets* solitary, sessile or subsessile, 4 or 5 grouped on short lateral branches on central axis. **Spikelet** laterally compressed, falling with glumes; *glumes* unequal, very dissimilar, awnless; lower glume small or reduced to small linear scale; upper glume lanceolate, longer than spikelet, keeled, deeply concave, glabrous or hairy, scabrid on keel, 1-nerved. **Floret** 1, bisexual; *lemma* similar in texture to glumes, scabrid on keel, hairy, hairs in tufts or a line of hairs on either side of keel, 3-nerved, entire, awnless; *palea* ± as long as lemma, obtuse, 2-keeled. **Lodicules** 2, cuneate. **Stamens** 3. **Ovary** ellipsoid; styles plumose above.

Species 1, sthn Afr.: *Catalepis gracilis* Stapf & Stent, Mpumalanga, E Free State, Lesotho, KwaZulu-Natal, bordering Lesotho and Eastern Cape.

***Catapodium** Link 9904200

(Pooideae—Poeae)

Link: 44 (1827); Stapf: 718 (1900); Hubbard: 181 (1954); Stace: 158 (1980) under *Desmazeria* Dumont; Clayton & Renvoize: 107 (1986); Gibbs Russell *et al.*: 78 (1990); Watson & Dallwitz: 207 (1994).

Scleropoa Griseb.: 431 (1846); Chippindall: 50 (1955).

Annual, tufted or culms solitary, sometimes geniculate. **Leaf blade** rolled or expanded, glabrous; *ligule* a hyaline, unfringed membrane. **Inflorescence** a panicle with somewhat rigid, short branches, or a raceme, spike-like, linear to ovate, secund; *spikelets* solitary. **Spikelet** 5–7(–10) mm long, laterally compressed, green or purplish in colour, disarticulating above glumes; *glumes* ± equal, shorter than spikelet, similar to dissimilar, keeled, membranous, awnless; lower glume 1–3-nerved; upper glume 3–5-nerved. **Florets** 3–10, bisexual or *uppermost floret* reduced and sterile; *lemma* overlapping at first, rounded at least towards base, glabrous, 5-nerved, awnless; *palea* ± equal to lemma, 2-keeled. **Lodicules** 2, ovate, hyaline. **Stamens** 3. **Ovary** ovoid, glabrous; styles distinct, plumose. $x = 7$.

Species 2, Europe and North Africa to Iran, mainly Mediterranean region, introduced elsewhere; 1 naturalised in sthn Afr.: **Catapodium rigidum* (L.) C.E.Hubb., coastal districts of Western Cape.

Cenchrus L. 9901400

(Panicoideae—Paniceae—Cenchrinae)

Linnaeus: 1049 (1753); Stapf: 431 (1899); Chippindall: 449 (1955); Delisle: 259 (1963); Launert: 45 (1970a); Clayton & Renvoize: 691 (1982); Clayton & Renvoize: 304 (1986); Clayton: 186 (1989); Gibbs Russell *et al.*: 79 (1990); Watson & Dallwitz: 210 (1994).

Annual or perennial. **Leaf blade** expanded, folded, or involute; *ligule* a fringed membrane to a fringe of hairs. **Inflorescence** a cylindrical spike-like panicle; each *spikelet* or *cluster of spikelets* enclosed by a deciduous involucre composed of 1 or more whorls of bristles, bristles joined at base, forming a disc below spikelet or some distance above, bristles sometimes ± flattened and/or hardened to form rigid spines enclosing spikelets, thus forming burrs. **Spikelet** lanceolate to ovate, dorsiventrally compressed, acute to acuminate; *glumes* unequal, awnless; lower glume up to half as long as spikelet, hyaline or membranous, 1–5-nerved; upper glume a little shorter than spikelet, 1–7-nerved. **Florets** 2; *lower floret* male or sterile with lemma as long as

spikelet, membranous, acuminate, 3–7-nerved, awnless, palea similar to lemma, hyaline; *upper floret* bisexual, *lemma* as long as spikelet, similar to firmer than glumes, membranous to chartaceous, not indurated, 5–7-nerved, entire, smooth, flat, with thin margins covering much of palea; *palea* similar to lemma, hyaline. **Lodicules** 0 or abortive. **Stamens** 3. **Ovary** ovoid; styles plumose above. **Caryopsis** ellipsoid to ovoid, dorsiventrally compressed. $x = 9, 12$ (aneuploids, polyploidy).

Species 22, tropical and warm temperate; 1 indigenous and 3 naturalised in sthn Afr., widespread.

Centropodia Rchb. 9902035

(Arundinoideae—Arundineae)

Reichenbach: 212a (1828); Chippindall: 246 (1955) under *Danthonia* Stapf; Conert: 239 (1962) under *Asthenatherum* Nevski; Hubbard: 122 (1970) under *Asthenatherum* Nevski; Cope: 657 (1982); Clayton & Renvoize: 177 (1986); Gibbs Russell *et al.*: 80 (1990); Watson & Dallwitz: 214 (1994).

Asthenatherum Nevski: 8 (1934).

Perennial or annual, tufted to decumbent, rhizomatous. **Leaf blade** linear or setaceous, somewhat rigid, flat or rolled and pungent; *ligule* a fringe of hairs. **Inflorescence** a panicle, dense and contracted; *spikelets* solitary, pedicelled or subsessile. **Spikelet** 7.5–24.0 mm long, lanceolate, laterally compressed, disarticulating above glumes and ± between florets; *glumes* ± equal, as long as to longer than spikelet, similar, firm, with hyaline margin, prominently 5–11-nerved, separated by an internode, awnless; upper glume somewhat narrower than lower, usually acuminate. **Florets** 3–6, bisexual or sometimes *upper floret* male, sterile and reduced to a small scale; *lemma* similar in texture to glumes, membranous, prominently 7–11-nerved, densely and shortly hairy between nerves and with tufts of hairs at point of insertion of median awn, 2-lobed, lobes narrow, hyaline and tapering into short straight lateral awns, central *awn* arising from sinus, geniculate; *callus* obliquely pungent, hairy; *palea* membranous, obtuse or 2-lobed, 2-keeled, keels winged. **Lodicules** 2, glabrous, cuneate, fleshy. **Stamens** 3. **Ovary** glabrous; styles long, densely plumose. $x = 6$ (high polyploidy).

Species 4, North Africa through Middle East to India; 2 in sthn Afr., Namibia, Botswana to Northern Cape.

Chaetobromus Nees 9902060

(Arundinoideae—Arundineae)

Nees ab Esenbeck: 449 (1836); Stapf: 537 (1899); Chippindall: 272 (1955); Clayton & Renvoize: 173 (1986); Gibbs Russell *et al.*: 81 (1990); Watson & Dallwitz: 219 (1994); Verboom & Linder: 57 (1998).

Perennial, tufted to mat-forming, sometimes stoloniferous or rooting from lower nodes. **Leaf blade** linear to linear-lanceolate, flat or folded; *ligule* a fringe of hairs. **Inflorescence** a panicle, open to contracted, sometimes with only a few spikelets; *spikelets* solitary, pedicelled, pedicel articulated some distance below spikelet, long-hairy at articulation. **Spikelet** 9–18 mm long, laterally compressed, falling with glumes and disarticulating between florets; *glumes* ± equal, as long as to longer than spikelet, keeled, membranous, pubescent, scabrid especially on nerves, awnless; lower glume 5–11-nerved; upper glume narrower, prominently and closely 3–5-nerved. **Florets** 2–4; *lower floret* bisexual; *upper floret* reduced; lemmas decreasing in size upwards, *lowest lemma* 2.5–5.8 mm long, membranous, 7–9-nerved, glabrous or loosely hairy, 2-lobed, lobes with slender, usually long awns or lower lemma awnless, central *awn* arising between lobes, awn twisted in lower part, geniculate or straight; *callus* pungent, hairy; *palea* obscurely 2-nerved, hyaline. **Lodicules** 2, fleshy, cuneate, glabrous. **Stamens** 3. **Ovary** glabrous; styles plumose above. **Caryopsis** lorate, pale brown or yellow, surface smooth, dull. $x = 6$.

Species 1, sthn Afr., S Namibia, Northern and Western Cape.

Chloris Sw. 9903010

(Chloridoideae—Cynodonteae—Chloridinae)

Swartz: 25 (1788); Stapf: (1900); Chippindall: 196 (1955); Launert: 47 (1970a); Renvoize: 337 (1974); Clayton & Renvoize: 236 (1986); Gibbs Russell *et al.*: 82 (1990); Watson & Dallwitz: 235 (1994).

Annual or perennial, tufted, stoloniferous and rhizomatous. **Leaf blade** expanded, folded or rolled, rounded or keeled and flabellate; *ligule* a short, fringed membrane or fringe of hairs. **Inflorescence** of few to many 1-sided spike-like racemes, digitate or densely crowded on an elongated axis; *spikelets* solitary or in pairs, shortly pedicelled or subsessile. **Spikelet** 1.2–5.0 mm long, laterally compressed, disarticulating above glumes; *glumes* unequal, shorter than spikelet to longer (at least upper glume), membranous, keeled, 1-nerved, awnless or with awn-point; upper glume acute to bidentate. **Florets** 2–6; *lowest floret* bisexual; rarely all bisexual; *lemma* similar to firmer in texture than glumes, membranous or cartilaginous, dissimilar; *lowest lemma* keeled, usually hairy on margins or keels, or with a long tuft of hairs on upper part, 1–7-nerved, shortly 2-lobed, with a subapical awn, *awn* as long as or longer than body of lemma; *callus* usually minute, rounded or pungent, hairy; *palea* as long as lemma, 2-keeled, hyaline; *remaining florets* sterile or much reduced, sometimes male; *second lemma* spathulate or obovate, truncate, glabrous, awned, awn shorter than body of lemma; *third* and *fourth lemma*, if present, much reduced, uppermost often reduced to a bristle. **Lodicules** 2, minute. **Stamens** 3. **Ovary** glabrous; styles plumose above. **Caryopsis** ellipsoid, trigonous to lanceolate and subterete. $x = 10$ (aneuploids, high polyploidy).

Species ± 55, tropical and warm temperate regions; 8 in sthn Afr., widespread.

Chrysopogon Trin. 9900500

(Panicoideae—Andropogoneae—Sorghinae)

Trinius: 187 (1820) name conserved; Stapf: 349 (1898) under *Andropogon* L.; Stapf: 159 (1917); Chippindall: 468 (1955); Clayton & Renvoize: 736 (1982); Clayton & Renvoize: 342 (1986); Gibbs Russell *et al.*: 85 (1990); Watson & Dallwitz: 240 (1994).

Perennial, tufted, often rhizomatous. **Leaf blade** linear, basal sheaths strongly compressed; *ligule* a fringed membrane or fringe of hairs. **Inflorescence** a terminal panicle consisting of many whorled branches on central axis, internodes filiform; *spikelets* dissimilar, in groups of 3, in long-short combinations: central spikelet sessile, two laterals pedicelled (rarely spikelets paired, one sessile, the other pedicelled), pedicels free from rachis, tops of pedicels long-hairy. **Sessile spikelet** ± laterally compressed, falling with glumes, joint and pedicel, awned or awnless; *glumes* ± equal; lower glume laterally compressed, indurated, rounded on back, often with spines on margins; upper glume thinner, keeled, shortly 2-lobed, sometimes awned from between lobes. **Florets** 2; *lower floret* sterile, reduced to a hyaline lemma, awnless; *upper floret* bisexual, *lemma* less firm than glumes, hyaline, glabrous, not keeled, 1–3-nerved, entire or minutely 2-lobed, awned from between lobes, *awn* geniculate; *callus* pungent, hairy, hairs long, commonly pallid or deep fulvous; *palea* small, hyaline or 0. **Lodicules** 2, glabrous, **Stamens** 3. **Ovary** ellipsoid; styles plumose above. **Caryopsis** narrowly ellipsoid.

Pedicelled spikelet well developed to rudimentary, dorsally compressed, usually purple, sometimes pallid, male or sterile, awned or awnless. $x = 10$ (polyploidy).

Species ± 26, mostly warm regions of both hemispheres; 1 in sthn Afr.: *Chrysopogon serrulatus* Trin., N Botswana, Northern Province and mainly North-West.

Cladoraphis Franch. 9902865

(Chloridoideae—Eragrostideae—Eleusininae)

Franchet: 673 (1887); De Winter: 132 (1955) included in *Eragrostis* Wolf: Phillips: 159 (1982); Clayton & Renvoize: 217 (1986); Gibbs Russell *et al.*: 86 (1990); Watson & Dallwitz: 245 (1994).

Perennial, tufted, prickly, woody. **Leaf blade** flat or rolled, hard and woody, pungent; *ligule* a fringe of hairs. **Inflorescence** a panicle with a stout central axis usually ending in spines and without spikelets, bearing short dorsal primary laterals, laterals secondarily branched and condensed into clusters appressed to central axis or forming simple spreading racemes; *spikelets* solitary, shortly pedicelled. **Spikelet** laterally compressed, disarticulating above glumes and tardily between florets; *glumes* ± equal, shorter than spikelet, similar, 3-nerved, awnless. **Florets** 3–20, bisexual; *uppermost floret* reduced; *lemma* similar in texture to glumes, entire, 3-nerved, rounded, usually glabrous or with short hairs, awnless; *palea* similar in texture to lemma. **Lodicules** 2, fleshy. **Stamens** 3. **Ovary** glabrous. **Caryopsis** narrowly oblong with free pericarp. $x = 10$.

Species 2, sthn Afr., Namibia and mainly western regions of Northern and Western Cape.

Cleistachne Benth. 9900480

(Panicoideae—Andropogoneae—Sorghinae)

Bentham: t. 1379 (1882); Stent: 253 (1924); Chippindall: 468 (1955); Clayton & Renvoize: 734 (1982); Clayton & Renvoize: 341 (1986); Gibbs Russell *et al.*: 86 (1990); Watson & Dallwitz: 247 (1994).

Annual, coarse, sometimes with stilt-roots. **Leaf blade** linear, rolled, often narrowed to a midrib and falsely petiolate; sheaths and blades hispid with tubercle-based hairs; *ligule* an unfringed membrane, scarious. **Inflorescence** a large terminal panicle, ± contracted, primary branches bearing spikelets at regular intervals; *spikelets* solitary, pedicels linear. **Spikelet** usually light brown to black, dorsiventrally compressed, falling with glumes; *glumes* ± equal, similar, leathery, hairy, with inrolled margins, awnless; lower glume broadly rounded, not 2-keeled. **Florets** 2; *lower floret* reduced to a lemma, hyaline, hairy, awnless; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, hairy, 3-nerved, incised, 2-lobed, awned from between lobes, *awn* geniculate, twisted, glabrous, longer than body of lemma; *callus* obtuse; *palea* minute, ciliate. **Lodicules** 2, broadly cuneate, ciliate, fleshy. **Stamens** 3. **Ovary** subovoid, glabrous; styles plumose above. **Caryopsis** oblong. $x = 9$ (polyploidy).

Species 1, tropical Africa and India: *Cleistachne sorghoides* Benth., Mpumalanga.

Coelachyrum Hochst. & Nees 9903360

(Chloridoideae—Eragrostideae—Eleusininae)

Hochstetter & Nees ab Esenbeck: 221 (1842); Chippindall: 121 (1955); Phillips: 159 (1982); Clayton & Renvoize: 220 (1986); Gibbs Russell *et al.*: 87 (1990); Watson & Dallwitz: 254 (1994).

Cypholepis Chiov.: 357 (1908); Phillips: 248 (1974); Watson & Dallwitz: 286 (1994).

Perennial, tufted. **Leaf blade** linear, usually expanded; *ligule* a fringed membrane. **Inflorescence** usually of open or dense, spike-like racemes along a central axis; *spikelets* solitary, shortly pedicelled. **Spikelet** laterally compressed, disarticulating above glumes and between florets; *glumes* ± equal to unequal, lanceolate, shorter than spikelet, membranous, rounded or lightly keeled on back, 1(3)-nerved. **Florets** 7–12, bisexual; *uppermost floret* sometimes male only; *lemma* saccate below, lightly keeled above middle, rounded on back in lower half, 3-nerved, hairy with club-shaped hairs on lower back, or glabrous, awnless; *callus* 0; *palea* shorter than lemma, glabrous or with club-shaped hairs on lower half. **Lodicules** 2, fleshy, glabrous. **Stamens** 3. **Ovary** glabrous. **Caryopsis** broadly ellipsoid, strongly flattened; pericarp free.

Species 1–8, Africa, Arabian Peninsula and Pakistan; 1 in sthn Afr.: *Coelachyrum yemenicum* (Schweinf.) S.M.Phillips, Namibia, Botswana, Northern Province, North-West and eastern regions of Northern Cape.

Coelorachis Brongn. 9900290

(Panicoideae—Andropogoneae—Rottboelliinae)

Brongniart: 64 (1831); Stapf: 78 (1917); Chippindall: 523 (1955); Clayton & Renvoize: 840 (1982); Veldkamp *et al.*: 288 (1986); Clayton & Renvoize: 365 (1986); Gibbs Russell *et al.*: 88 (1990); Watson & Dallwitz: 255 (1994).

Coarse perennial, tufted. **Leaf blade** expanded or folded; basal sheath often strongly laterally compressed; *ligule* a fringed membrane to a fringe of hairs. **Inflorescence** of spike-like racemes, solitary and terminal or aggregated into a spatheate, leafy false panicle, racemes cylindrical, internodes clavate, mostly shorter than sessile spikelets, rachis joints transverse; *spikelets* in pairs, secund, in long-short combinations: one sessile, the other pedicelled, pedicels free. **Sessile spikelet** 4.5–5.0 mm long, dorsiventrally compressed, glabrous; *glumes* ± equal, dissimilar, indurated, awnless; lower glume flat or slightly rounded on back, smooth or variously sculptured, glabrous, 2-keeled upwards, keels winged, faintly 7-nerved; upper glume keeled, acute, wingless. **Florets** 2, *lower floret* sterile, reduced to a hyaline lemma, 2-nerved or nerveless, awnless; palea reduced or 0; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, 2-nerved or nerveless, entire, glabrous, awnless; *callus* truncate with prominent peg, glabrous; *palea* present, relatively long. **Lodicules** 2, cuneate, fleshy, glabrous. **Stamens** 3. **Ovary** glabrous; styles plumose. **Caryopsis** oblong, dorsiventrally compressed.

Pedicelled spikelet smaller than sessile spikelet, well developed or vestigial, male or sterile, rarely bisexual, awnless. $x = 9$ (polyploidy).

Species ± 21, mainly tropical; 1 in sthn Afr.: *Coelorachis capensis* Stapf, NE KwaZulu-Natal to Eastern Cape.

*Coix L. 9900020

(Panicoideae—Andropogoneae—Coicinae)

Linnaeus: 972 (1753); Stapf: 27 (1917); Chippindall: 524 (1955); Clayton & Renvoize: 857 (1982); Clayton & Renvoize: 373 (1986); Gibbs Russell *et al.*: 89 (1990); Watson & Dallwitz: 256 (1994).

Annual. **Leaf blade** linear-lanceolate, expanded, often cordate at base; *ligule* an unfringed to fringed membrane. **Inflorescence** of terminal and axillary branches, these often many, forming a spatheate, leafy false panicle; spikelet-bearing axis with a smooth, globose or elongated, hard, ivory-like bead or cupule comprising 2 racemes; female raceme enclosed by bead (a modified leaf sheath), consisting of 1 sessile spikelet accompanied by 2 barren pedicels; male raceme exserted from mouth of bead as a tassel and falling early; *spikelets* in pairs or threes, 1 or 2 sessile, 1 pedicelled. **Female spikelet** falling with glumes; *glumes* ± equal, beaked, dissimilar, awnless; lower glume subglobose, flattened on back;

upper glume strongly keeled. **Florets** 2, *lower floret* sterile, reduced to a membranous lemma, awnless; *upper floret* female; *lemma* less firm to similar in texture to glumes, membranous, mucronate, entire, glabrous, 3–5-nerved, mucronate (beaked); *palea* membranous. **Lodicules** 0. **Stamens** 0, or 3 staminoids. **Ovary** glabrous; stigmas 2, exserted from bead. **Caryopsis** subglobose to ellipsoid.

Male spikelet lanceolate to elliptic-oblong; lower glume flat on back, 2-keeled, keels winged above, upper glume boat-shaped. **Florets** 2, both male or one sterile; lemma and palea membranous. **Stamens** 3. $x = 5$ (high polyploidy).

Species ± 5, tropical Asia; 1 sporadically occurring in sthn Afr.: **Coix lacryma-jobi* L., cultivated for the 'beads' which are strung into necklaces; in eastern sthn Afr. as an escape from cultivation.

Colpodium Trin. 9904100

(Pooideae—Poeae)

Trinius: 119 (1820); Clayton: 49 (1970); Clayton & Renvoize: 103 (1986); Gibbs Russell *et al.*: 89 (1990); Hedberg & Hedberg: 601 (1994); Watson & Dallwitz: 260 (1994).

Perennial, tufted, decumbent, stoloniferous, rooting at nodes, plants of wet areas at high altitudes. **Leaf blade** expanded, blunt at apex; *ligule* an unfringed membrane. **Inflorescence** a spreading, ovate panicle; *spikelets* pedicelled. **Spikelet** slightly laterally compressed, disarticulating above glumes; *glumes* unequal, shorter than spikelet, similar, firmly membranous with hyaline margins and tip, lightly keeled near base, rounded above, nerves falling short of obtuse or subacute tip, awnless. **Floret** 1, bisexual; *lemma* elliptic-oblong, thinly membranous, without keel, 3–5-nerved, glabrous, awnless; *callus* short, blunt, glabrous; *palea* as long as lemma. **Lodicules** 2- or 3-lobed. **Stamens** 3. **Ovary** glabrous. $x = 2$ or 7 (high polyploidy).

Species ± 3–20, Middle East to Africa; 1 in sthn Afr.: *Colpodium drakensbergensis* O.Hedberg & I.Hedberg, KwaZulu-Natal on Drakensberg and Lesotho in seepage areas.

***Cortaderia** Stapf 9902110

(Arundinoideae—Arundineae)

Stapf: 378 (1897) name conserved; Robinson: 343 (1984); Clayton & Renvoize: 180 (1986); Gibbs Russell *et al.*: 90 (1990); Watson & Dallwitz: 263 (1994).

Perennial, bisexual or gynodioecious, tufted, tall tussocks up to 4 m tall. **Leaf blade** disarticulating from sheaths; *ligule* a fringe of hairs. **Inflorescence** a large, open, plumose panicle, 400–800 mm long, with many spikelets; *spikelets* pedicelled, either bisexual or female, spikelets all alike in sexuality on same plant. **Spikelet** 10–18 mm long; laterally compressed, disarticulating above glumes; *glumes* ± equal, shorter to as long as spikelet, narrow, hyaline, similar, glabrous, 1(3)-nerved, awnless. **Florets** 1–7, depending on sex of spikelet; *lemma* similar to firmer in texture to glumes, hyaline or membranous, not becoming indurated, 7–9-nerved, glabrous or hairy, hairs long and fine, reaching from base to apex of body of lemma, entire, awn-like, awnless; *callus* long, pointed, hairy; *palea* glabrous, relatively long. **Lodicules** 2, fleshy, ciliate. **Stamens** 3, or 0 or minute in female spikelets of dioecious plants. **Ovary** glabrous. $x = 9$ (high polyploidy).

Species 24, mainly South America, also in New Zealand and New Guinea; 2 cultivated and as escapes in sthn Afr., southern regions of northern provinces of South Africa, KwaZulu-Natal, Western and Eastern Cape.

***Corynephorus** P.Beauv. 9901880

(Pooideae—Aveneae—Aveninae)

Palisot de Beauvois: 90 (1812) name conserved; Tutin: 231 (1980); Clayton & Renvoize: 130 (1986); Gibbs Russell *et al.*: 91 (1990); Watson & Dallwitz: 265 (1994).

Annual, solitary or tufted. **Leaf blade** linear, folded or rolled; *ligule* an unfringed membrane. **Inflorescence** an open or contracted panicle; *spikelets* pedicelled. **Spikelet** laterally compressed, disarticulating above glumes, rachilla extension present; *glumes* equal, ± as long as spikelet, similar, awnless. **Florets** 2, bisexual; *lemma* similar in texture to glumes, membranous, 1-nerved, minutely 2-lobed, awned; *awn* basal, longer than body of lemma, geniculate, a ring of hairs at junction of twisted column and clavate limb; *callus* short, hairy; *palea* present. **Lodicules** 2, membranous, glabrous. **Stamens** 3. **Ovary** glabrous. **Caryopsis** ellipsoid. $x = 7$.

Species 5, Europe and Mediterranean to Iran; 1 naturalised in sthn Afr.: **Corynephorus fasciculatus* Boiss. & Reut., Western Cape.

Craspedorhachis Benth. 9903090

(Chloridoideae—Cynodonteae—Chloridinae)

Bentham: t. 1377 (1882); Pilger: 98 (1956); Chippindall: 204 (1955); Clayton & Renvoize: 240 (1986); Gibbs Russell *et al.*: 92 (1990); Watson & Dallwitz: 267 (1994).

Perennial, tufted, rhizomatous. **Leaf blade** linear; *ligule* a short, fringed membrane or a fringe of hairs. **Inflorescence** of several slender, spike-like racemes, scattered up long central axis, rarely subdigitate; *spikelets* in two rows on a flat rachis; spikelet solitary. **Spikelet** 2.5–4.0 mm long, dorsiventrally compressed, disarticulating above glumes; *glumes* ± equal, longer than spikelet, dissimilar, rather firm, membranous, acute, glabrous, awnless; lower glume appearing winged in upper half, 1-nerved or nerveless, asymmetrically 1-keeled; upper glume 1–3-nerved, flat-backed with 2 keels. **Floret** 1, bisexual; *lemma* less firm than glumes, hyaline, entire, hairy or glabrous, weakly 3-nerved, lateral nerves near margin, weakly keeled, awnless or mucronate at apex; *palea* shorter than lemma, hyaline, faintly 2-nerved, 2-keeled with long hairs on keels. **Lodicules** 2. **Stamens** 3. **Ovary** glabrous; styles plumose. **Caryopsis** obovoid.

Species ± 2–5, tropics of Africa, North and South America; 2 in sthn Afr., N Namibia.

Ctenium Panz. 9902990

(Chloridoideae—Cynodonteae—Chloridinae)

Panzer: 36, 59 (1813) name conserved: Stapf: 638 (1900); Stent: 289 (1924); Chippindall: 192 (1955); Renvoize: 323 (1974); Clayton & Renvoize: 241 (1986); Gibbs Russell *et al.*: 93 (1990); Watson & Dallwitz: 272 (1994).

Perennial, rarely annual, tufted, wiry. **Leaf blade** linear, expanded or rolled; *ligule* a very short fringed membrane. **Inflorescence** a solitary, terminal, often strongly falcate, 1-sided spike; *spikelets* alternately biseriate along midrib of flattened rachis; spikelet solitary, sessile. **Spikelet** laterally compressed, disarticulating above glumes, not between florets; *glumes* unequal, dissimilar, tubercled on nerves; lower glume membranous, ± half as long as upper, 1-nerved, acute, keeled, with awn-point; upper glume longer than lemma, lanceolate, flat or rounded obliquely, acuminate, 2- or 3-nerved, awned from back below apex with oblique dorsal awn. **Florets** 3–5, *lower* 2 *florets* male or sterile, *third floret* bisexual, *uppermost floret* rudimentary or male; *lemma* less firm in texture than glumes, dissimilar, oblong, entire, obtuse, 3-nerved, hairy or uppermost glabrous, awned from just below apex; *awn* straight; *palea* shorter than lemma, 2-keeled, 2-nerved. **Lodicules** 2, quadrate-cuneate or

ovate, delicate. **Stamens** 3 in bisexual floret, 2 in male floret. **Ovary** glabrous; styles distinct, plumose above. **Caryopsis** ellipsoid. $x = 9$ (high polyploidy).

Species ± 20, tropical and subtropical America and Africa, Madagascar; 1 in sthn Afr.: *Ctenium concinnum* Nees, northern provinces of South Africa, Swaziland, KwaZulu-Natal, Lesotho and Eastern Cape.

Cymbopogon Spreng. 9900720

(Panicoideae—Andropogoneae—Andropogoninae)

Sprengel: 14 (1815); Stapf: 335 (1898) under *Andropogon* L.; Stent: 247 (1924); Chippindall: 505 (1955); Clayton & Renvoize: 759 (1982); Clayton & Renvoize: 351 (1986); Gibbs Russell *et al.*: 94 (1990); Watson & Dallwitz: 278 (1994).

Perennial, tufted, usually aromatic. **Leaf blade** filiform to broadly linear, flat or folded; *ligule* an unfringed or fringed membrane. **Inflorescence** of paired, short racemes ± enclosed by a spatheole, these crowded into a leafy, false panicle which is often large and complex; raceme bases subequal, flattened, spreading or deflexed; *spikelets* paired, not secund, in long-short combinations: one sessile, the other pedicelled, each pair usually differing in sex and ± in shape (heterogamous) except those of lowest pair of lower or both racemes, which are homogamous; internodes and pedicels linear. **Sessile spikelet** variously compressed, falling with glumes; *glumes* ± equal in size, dissimilar in form and texture, ± chartaceous, usually 1–5-nerved; lower glume almost flat or slightly depressed or narrowly grooved on back, 2-keeled, keels usually lateral, with margins sharply inflexed at least from middle upwards, keels winged or wingless; upper glume ± boat-shaped, keeled upwards. **Florets** 2; *lower floret* sterile, reduced to a lemma, hyaline, awnless, 1-nerved; *upper floret* of homogamous pair usually male, rarely sterile, bisexual in heterogamous pair; *lemma* less firm than glumes, hyaline, glabrous, rarely entire, incised, 2-lobed, awned from between lobes; *awn* geniculate, glabrous; *callus* obtuse, hairy, inserted in concave or cupular top of internode; *palea* 0. **Lodicules** 2, minute, glabrous. **Stamens** 3. **Ovary** subglobose, glabrous; styles plumose above. **Caryopsis** oblong, subterete to plano-convex.

Pedicelled spikelet never depressed on back, only lower lemma present, male or sterile, rarely suppressed, awnless. $x = 5, 10$ (polyploidy).

Species ± 40, tropical and subtropical Africa, Asia, Australia; 6 in sthn Afr., widespread.

Cynodon Rich. 9902960

(Chloridoideae—Cynodonteae—Chloridinae)

Richard: 85 (1805) name conserved; Stapf: 633 (1900); Stent: 288 (1924); Stent: 274 (1927a); Chippindall: 199 (1955); Clayton & Harlan: 185 (1970); De Wet & Harlan: 565 (1970); De Wet & Harlan: 53 (1971); Clayton: 316 (1974); Clayton & Renvoize: 243 (1986); Gibbs Russell *et al.*: 95 (1990); Watson & Dallwitz: 281 (1994).

Perennial, stoloniferous or rhizomatous, often mat-forming. **Leaf blade** linear, flat or folded; *ligule* a fringed membrane or a fringe of hairs. **Inflorescence** of 1–5 closely spaced 1-sided spikes, in pairs, digitate or subdigitate; rachis flattened; *spikelets* solitary, sessile. **Spikelet** 2.0–3.5 mm long, strongly laterally compressed, disarticulating above glumes; *glumes* ± equal to unequal, similar, narrow, shorter than or rarely as long as spikelet, acute, keeled, sometimes scabrid on keel, awnless, 1-nerved, rarely upper glume 3-nerved. **Floret** 1, bisexual, with or without a rachilla extension, rarely bearing a second floret which is usually small and reduced, rarely well developed; *lemma* similar to firmer in texture to glumes, obtuse, 1–4-nerved, keeled, keel winged or wingless, hairy on keel and often on margins, flanks usually glabrous, awnless; *callus* glabrous; *palea* as long as or shorter than lemma, obtuse or subacute, membranous, 2-keeled. **Lodicules** 2, minute, obovate-cuneate, glabrous. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose above. **Caryopsis** ellipsoid, laterally compressed. $x = 9, 10$ (polyploidy).

Species ± 10, warm climates of both hemispheres; 8 in sthn Afr., widespread, several selected strains used for lawns and sports grounds.

***Cynosurus** L. 9903730

(Pooideae—Poeae)

Linnaeus: 72 (1753); Stapf: 689 (1900); Chippindall: 61 (1955); Tutin: 171 (1980); Clayton & Renvoize: 98 (1986); Gibbs Russell *et al.*: 98 (1990); Watson & Dallwitz: 282 (1994).

Annual or (rarely) perennial, tufted, sometimes decumbent. **Leaf blade** expanded; *ligule* a hyaline, unfringed membrane. **Inflorescence** a bristly panicle, somewhat ovoid, spike-like or capitate, ± 1-sided on central axis; *spikelets* paired, dissimilar, bisexual spikelets mixed and ± concealed by sterile ones, fertile spikelets subsessile or shortly pedicelled. **Fertile spikelet** laterally compressed, disarticulating above glumes; *glumes* ± equal, similar, narrow, lanceolate, long-acuminate to acute, 1-nerved, scabrid on keel, awnless. **Florets** 2–5; *lemma* similar to firmer in texture than glumes, rounded on back, 5-nerved, entire or 2-lobed, awned from close below apex; *awn* straight, ± twice length of lemma body; *callus* short, glabrous; *palea* ± equal to lemma and similar in texture, acuminate, bidentate, 2-keeled. **Lodicules** 2. **Stamens** 3. **Ovary** glabrous; styles plumose above. **Caryopsis** oblong.

Sterile spikelet consisting of rigid, lanceolate, awned glumes and lemma which are persistent on panicle. $x = 7$.

Species 8, Europe, Middle East and North and sthn Afr.; ± 2 in sthn Afr.: **Cynosurus echinatus* L. naturalised and *Cynosurus coloratus* Lehm. ex Nees, possibly indigenous, Free State and Western Cape.

***Dactylis** L. 9903980

(Pooideae—Poeae)

Linnaeus: 71 (1753); Stapf: 695 (1900); Chippindall: (1955); Clayton: 43 (1970); Tutin: 170 (1980); Clayton & Renvoize: 102 (1986); Gibbs Russell *et al.*: 99 (1990); Watson & Dallwitz: 289 (1994).

Perennial, tufted, rhizomatous (rhizome often oblique). **Leaf blade** linear to linear-lanceolate, expanded or rolled; sheaths keeled, compressed; *ligule* an unfringed membrane. **Inflorescence** an open or contracted panicle, lobed, branches secund; *spikelets* crowded in dense shortly pedicelled clusters at ends of short main branches. **Spikelet** 5–9 mm long, strongly laterally compressed, disarticulating above glumes; *glumes* ± equal or unequal, similar, shorter than spikelet, lanceolate to ovate, rigid, membranous, 3-nerved, strongly keeled, glabrous or hairy on keel, acuminate to mucronate or awned. **Florets** 2–5(7), bisexual; *uppermost floret* often sterile; *lemma* firmer in texture than glumes, lanceolate-oblong, 5-nerved, strongly keeled, keels hairy or scabrid, shortly awned; *awn* straight, shorter than body of lemma; *callus* short, glabrous; *palea* slightly shorter than lemma, 2-keeled. **Lodicules** 2, bilobed, glabrous. **Stamens** 3. **Ovary** glabrous; styles plumose. **Caryopsis** ovoid, tightly enclosed by hardened lemma and palea. $x = 7$ (polyploidy, B-chromosomes).

Species 1–5, temperate Eurasia; 1 in sthn Afr.: **Dactylis glomerata* L., cultivated and sometimes occurring as an escape.

Dactyloctenium Willd. 9903320

(Chloridoideae—Eragrostideae—Eleusininae)

Willdenow: 1029 (1809); Stapf: 646 (1900); Stent: 292 (1924); Fisher & Schweickerdt: 49 (1941); Chippindall: 131 (1955); Launert: 53 (1970); Phillips: 250 (1974); Clayton & Renvoize: 223 (1986); Gibbs Russell *et al.*: 99 (1990); Watson & Dallwitz: 290 (1994).

Annual or perennial, tufted, mat-forming; often stoloniferous, rhizomatous or rooting from lower nodes, sometimes geniculate. **Leaf blade** linear to linear-lanceolate, expanded or rolled; *ligule* an unfringed membrane or fringe of hairs. **Inflorescence** of 2–9 spikes, digitate or subdigitate, 1-sided on a flattened rachis, tips of rachis a barren, rigid, pointed extension; *spikelets* solitary, sessile, densely imbricate, biseriate. **Spikelet** laterally compressed, disarticulating above glumes, usually not between florets; *glumes* ± equal, shorter than spikelet, membranous, strongly keeled, prominently 1-nerved, both or only upper with nerve excurrent into a rigid awn that curves outwards from back of glume; lower glume ovate, acute; upper glume elliptic-oblong. **Florets** 3–7, bisexual; *uppermost floret* rudimentary; *lemma* ovate, membranous, keeled, glabrous, 1–3-nerved, lateral nerves obscure, keeled, keels often scabrid, acute and awnless to mucronate or awned; *awn* short, straight; *palea* ± as long as lemma, membranous, ovate-lanceolate or oblong-lanceolate, 2-keeled, deeply concave between keels. **Lodicules** 2, cuneate, minute, hyaline. **Stamens** 3. **Ovary** glabrous; styles plumose above. **Caryopsis** angular, surface with ornamentation, enclosed in free, hyaline pericarp. $x = 10, 12$ (polyploidy).

Species 13, warm regions of the world; 4 in sthn Afr., widespread, not recorded from Western Cape.

Danthoniopsis Stapf 9901770

(Panicoideae—Arundinelleae)

Stapf: t. 3075 (1916); Chippindall: 285 (1955); Conert: 317 (1957); Clayton & Renvoize: 317 (1986); Clayton: 199 (1989); Gibbs Russell *et al.*: 101 (1990); Watson & Dallwitz: 298 (1994).

Perennial, rarely annual, tufted. **Leaf blade** linear or lanceolate-linear, expanded; *ligule* a fringe of hairs. **Inflorescence** an open or contracted panicle; *spikelets* paired, rarely in threes or solitary, pedicelled, pedicels free. **Spikelet** 4–20 mm long, laterally compressed, disarticulating above glumes; *glumes* very unequal, scarious-membranous to chartaceous, rarely thinly coriaceous, 3–5-nerved, glabrous, dissimilar; lower glume not more than half the length of upper; upper glume lanceolate, ovate, oblong. **Florets** 2; *lower floret* male with lemma similar to upper glume, as long as or slightly shorter than spikelet, (3)5–9-nerved, awnless; palea membranous, narrow, 2-keeled with keels very narrowly winged; *upper floret* bisexual, *lemma* 7–9-nerved, similar in texture to glumes, hairy, hairs in 2–8 distinct tufts or fringes or tufts mixed with dispersed hairs, deeply 2-lobed, lobes acute, sometimes produced into fine scaberulous awns, awned from between lobes; *awn* geniculate, twisted below bend; *callus* short, square to oblong, obtuse; *palea* similar to that of lower floret but keels firmer and usually with wider wings; wings expanded into ± triangular or clavate appendages. **Lodicules** 2, cuneate, fleshy. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose above. $x = 12$ (1 report, polyploidy).

Species ± 20, Africa, Arabian Peninsula; 6 in sthn Afr., Namibia into Northern Cape, Northern Province, Mpumalanga and KwaZulu-Natal.

***Deschampsia** P.Beauv. 9901890

(Pooideae—Aveneae—Aveninae)

Palisot de Beauvois: 91 (1812); Chippindall: 84 (1955); Clayton: 91 (1970); Clayton & Renvoize: 129 (1986); Gibbs Russell *et al.*: 103 (1990); Watson & Dallwitz: 307 (1994).

Perennial, rarely annual, tufted. **Leaf blade** filiform to linear, flat or folded; *ligule* an unfringed membrane, often elongated. **Inflorescence** a panicle, lax and open, rarely contracted; *spikelets* pedicelled. **Spikelet** small, 3–6 mm long, shining, laterally compressed, disarticulating above glumes and between florets, rachilla pilose or rarely glabrous, distinctly elongated between florets, produced as a fine bristle; *glumes* ± equal, shorter to longer than spikelet, similar, subscarious to membranous with thin shining margins, keeled, mostly acute; lower glume 1-nerved; upper glume 1–3-nerved. **Florets** usually 2, bisexual, rarely *uppermost floret* reduced; *lemma* similar in texture to firmer than glumes, lanceolate, rounded on back, obscurely 4–7-nerved, 2–4-lobed or lacerate-truncate at apex, awned from back near base; *awn* straight or geniculate, as long as to longer than body of lemma; *callus* minute, obtuse, usually hairy; *palea* ± as long as lemma, 2-keeled. **Stamens** 3. **Ovary** ellipsoid, glabrous; styles plumose above. **Caryopsis** ellipsoid, glabrous. $x = 7, 13$ (aneuploids, high polyploidy, B-chromosomes).

Species ± 40, temperate regions throughout the world and high-altitude tropics; 2 naturalised in sthn Afr., Free State, Lesotho, Eastern Cape region bordering Lesotho and Western Cape.

Diandrochloa De Winter 9902852

(Chloridoideae—Eragrostideae—Eleusininae)

De Winter: 387 (1960); Stapf: 630 (1900) under *Eragrostis* Wolf; De Winter: 182 (1955); Clayton & Renvoize: 215 (1986), included in *Eragrostis* Wolf; Gibbs Russell *et al.*: 104 (1990); Watson & Dallwitz: 313 (1994).

Annual or rarely perennial, tufted, often hygrophilous. **Leaf blade** linear to linear-lanceolate, expanded; *ligule* an unfringed membrane. **Inflorescence** a panicle, contracted, dense or much branched and divaricate, usually rigid, always much longer than broad, branches in pseudowhorls on a strongly developed central axis; *spikelets* solitary, pedicelled. **Spikelet** 1–3 mm long, laterally compressed, disarticulating above glumes and between florets; *glumes* unequal to ± equal, shorter than spikelets, ovate to lanceolate, membranous, often subhyaline, keeled, 1-nerved, awnless. **Florets** 2–10, bisexual, sometimes *uppermost floret* rudimentary; *lemma* 0.5–1.0 mm long, similar to firmer in texture to glumes, usually translucent or thinly coriaceous, glabrous, strongly keeled, often depressed between keels, 3-nerved, nerves distinct, rounded, emarginate or acute or sometimes somewhat erose, awnless; *callus* short, truncate, glabrous; *palea* subequal to lemma, membranous, 2-keeled, nerves strongly developed in lower part of keels, apex truncate or rounded, or 3-lobed. **Lodicules** 2, truncate. **Stamens** 2. **Ovary** glabrous; styles terminal, plumose. $x = 10$.

Species ± 7, Americas, Australia, Asia and Africa; 2 in sthn Afr., widespread but not recorded in Western Cape.

Dichanthium Willemet 9900640

(Panicoideae—Andropogoneae—Sorghinae)

Willemet: 11 (1796); Chippindall: 480 (1955); Clayton & Renvoize: 722 (1982); Clayton & Renvoize: 342 (1986); Gibbs Russell *et al.*: 105 (1990); Watson & Dallwitz: 320 (1994).

Perennial, rarely annual, tufted. **Leaf blade** narrow-linear, rolled or usually expanded, sometimes aromatic; *ligule* an unfringed to a fringed membrane. **Inflorescence** terminal, or sometimes axillary in spatheate, leafy, false panicles, or digitate or subdigitate racemes with or without 1 or more homogamous pairs of spikelets; internodes and pedicels linear, solid, truncate to oblique at tip; *spikelets* in pairs, secund, in long-short combinations: one sessile, the other pedicelled, free of rachis.

Sessile spikelet dorsiventrally compressed, falling with glumes; *glumes* ± equal; lower glume lanceolate or elliptic-oblong, obtuse to truncate, hairy, 2-keeled, acute to broadly obtuse; upper glume somewhat thinner in texture, 1-keeled, ciliate. **Florets** 2, *lower floret* sterile, reduced to a lanceolate hyaline lemma, entire, awnless; *upper floret* bisexual; *lemma* less firm than glumes, reduced to a linear, entire, hyaline stipe, awned; *awn* geniculate, twisted, longer than body of lemma; *callus* very short, rounded, hairy; *palea* minute or suppressed. **Lodicules** 2, fleshy, minute, glabrous. **Stamens** 1–3. **Ovary** ellipsoid, glabrous; style plumose above. **Caryopsis** oblong, dorsiventrally compressed.

Pedicelled spikelet similar to sessile spikelet, male or sterile. $x = 10$ (polyploidy).

Species ± 20, Old World tropics; 2 in sthn Afr., 1 of which is naturalised, widespread except in Northern Cape and not recorded in Western and Eastern Cape.

Digitaria Haller 9900890

(Panicoideae—Paniceae—Digitariinae)

Haller: 244 (1768) name conserved; Stapf: 372 (1898); Henrard: (1950); Chippindall: 392 (1955); Veldkamp: 20 (1973); Clayton & Renvoize: 619 (1982); Kok: 184 (1984); Clayton & Renvoize: 298 (1986); Goetghebeur & Van der Veken: 133 (1989); Kok *et al.*: 141 (1989); Gibbs Russell *et al.*: 106 (1990); Watson & Dallwitz: 326 (1994).

Digitariella De Winter: 467 (1961).

Annual or perennial, often rhizomatous or stoloniferous, tufted or decumbent, sometimes rooting at lower nodes. **Leaf blade** usually linear and expanded; *ligule* an unfringed membrane. **Inflorescence** terminal, composed of racemes, these spike-like, digitate or subdigitate or rarely borne on elongated central axis or solitary, rachis flat or triangular, sometimes winged; *spikelets* abaxial, solitary, in pairs or in triplets, unequally pedicelled. **Spikelet** ovoid to lanceolate, dorsiventrally compressed, falling entire at maturity, variously pubescent, rarely glabrous; *glumes* unequal, dissimilar, awnless; lower glume abaxial, minute (up to quarter length of spikelet) or 0, either a triangular scale or a fragile, membranous collar, not clasping base of spikelet, rarely nerved; upper glume variable in length, 3–7-nerved, rarely nerveless, usually somewhat pubescent. **Florets** 2; *lower floret* sterile; lemma lanceolate, usually as long as spikelet, rarely reduced to a small scale, flat on back, 3–11-nerved, usually densely hairy; palea reduced to a minute scale or 0; lodicules occasionally developed; *upper floret* bisexual, *lemma* ± as long as spikelet, same texture to firmer than glumes, chartaceous and smooth to granulate, becoming variously coloured in fruit (pale to dark brown), minutely rounded dorsally, the flat, thin hyaline margins enfolding and enclosing most of palea (Digitaria-type), glabrous, not or faintly 3-nerved, awnless; *palea* as long as lemma, not or faintly 2-nerved. **Lodicules** cuneate, flat, 3-nerved. **Stamens** 3. **Ovary** glabrous, ovoid; styles distinct, plumose above. **Caryopsis** oblong, mainly plano-convex in section, mostly acute to subacute. $x = 9$ (15, 17) (high polyploidy).

Species ± 230, cosmopolitan, mainly tropical and warm temperate; ± 35 in sthn Afr., widespread.

Diheteropogon (Hack.) Stapf 9900810

(Panicoideae—Andropogoneae—Andropogoninae)

Stapf: t. 3093 (1922); Chippindall: 518 (1955); Anderson: 7 (1966) under *Andropogon* L.; Clayton: 73 (1966a); Clayton & Renvoize: 783 (1982); Clayton & Renvoize: 353 (1986); Gibbs Russell *et al.*: 114 (1990); Watson & Dallwitz: 330 (1994).

Perennial, tufted, rhizomatous. **Leaf blade** linear or tapering from a cordate base; *ligule* an unfringed membrane. **Inflorescence** of paired, spike-like racemes, shortly peduncled, terminal or in a spatheate false panicle, racemes not deflexed, bases subterete, with 1–many homogamous spikelets in lower part, remaining spikelets heterogamous; internodes and pedicels linear; *spikelets* paired, in long-short combinations: one sessile, one pedicellate. **Sessile spikelet** dorsiventrally compressed, falling with glumes; *glumes* ± equal, subcoriaceous, awnless, dissimilar, 2–7-nerved; lower glume usually with a deep groove on back, 2-keeled, keels dorsal and ± rounded; upper glume not 2-keeled. **Florets** 2; *lower floret* sterile, reduced to a lemma, hyaline, hairy, 2-nerved; *upper floret* bisexual (except at base of raceme), glabrous; *lemma* less firm than glumes, hyaline, 2-lobed, awned from sinus; *awn* stout, geniculate, column hairy; *callus* long, acute to pungent, densely tomentose, deeply inserted into hollow top of internode; *palea* short, narrow, hyaline, 2-nerved. **Lodicules** 2, cuneate. **Stamens** 3. **Ovary** glabrous; styles terminal, plumose. **Caryopsis** lanceolate to oblanceolate.

Pedicelled spikelet larger than sessile spikelet, male, awned or awnless. $x = 10$ (polyploidy).

Species 5, tropical Africa; 2 in sthn Afr., northern provinces of South Africa, Swaziland, KwaZulu-Natal, Eastern Cape, rarely in Namibia.

Dinebra Jacq. 9903300

(Chloridoideae—Eragrostideae—Eleusininae)

Jacquin: 77 (1809); Stent: 291 (1924); Chippindall: 185 (1955); Phillips: 411 (1973); Phillips: 272 (1974); Clayton & Renvoize: 214 (1986); Gibbs Russell *et al.*: 116 (1990); Watson & Dallwitz: 336 (1994).

Annual, tufted to decumbent. **Leaf blade** expanded, linear, glabrous; *ligule* a narrow fringed membrane. **Inflorescence** narrow with many dense, short, very compact spikes on a central axis, these becoming deflexed at maturity, lower spikelets of each spike often replaced by small deciduous branchlets, rachis of spikes flattened; *spikelets* solitary, sessile. **Spikelet** 5.7–9.0 mm long, laterally compressed, disarticulating above glumes and between florets, wedge-shaped; *glumes* ± equal, as long as to longer than spikelet, lanceolate, glabrous, long-acuminate, tapering into a short, straight awn, 1-nerved, keeled, scabrid on keels. **Florets** 1–3, bisexual but *uppermost floret* reduced; *lemma* less firm to similar in texture to glumes, membranous, lanceolate, acute, 3-nerved, keeled, glabrous or pilose around lower half of back and along lateral nerves, usually minutely 2-toothed and mucronate at apex; *palea* as long as lemma, bidentate, 2-keeled, membranous, pilose on flaps alongside keels. **Lodicules** 2. **Stamens** 3. **Ovary** glabrous; styles distinct, short, plumose. **Caryopsis** ellipsoid-oblong. $x = 10$.

Species 3, Africa to India and Madagascar; 1 in sthn Afr.: *Dinebra retroflexa* (Vahl) Panz. var. *condensata* S.M.Phillips, Namibia, Botswana, northern provinces of South Africa.

Dregeochloa Conert 9902045

(Arundinoideae—Arundineae)

Conert: 335 (1966); Stapf: 530 (1899) under *Danthonia* Stapf; Chippindall: 245 (1955) under *Danthonia* Stapf; Launert: 68 (1970a); Clayton & Renvoize: 177 (1986); Gibbs Russell *et al.*: 118 (1990); Watson & Dallwitz: 345 (1994).

Danthonia Stapf: 516 (1899) in part.

Perennial, tufted, with short branched rhizomes, often forming low cushions. **Leaf blade** linear or ovate-lanceolate to ovate, usually folded, sometimes rigid or succulent; *ligule* a minute fringe of hairs. **Inflorescence** usually a single raceme, rarely a dense, contracted panicle; *spikelets* solitary, on hairy pedicels. **Spikelet** 10–15

mm long, ± laterally compressed, lanceolate, disarticulating above glumes; *glumes* ± equal, as long as to longer than spikelet, similar, lanceolate to broadly lanceolate, membranous, rounded, flat or with more than one keel, 5–7-nerved, minutely hairy, acute, awnless. **Florets** 3–9; bisexual; *uppermost floret* reduced and sterile; *lemma* similar in texture to glumes, membranous, 7–9-nerved, hairy, hairs in tufts or not tufted, mixed, tufts usually in a transverse row at base of lobes with 1 or 2 larger marginal tufts below these, 2-lobed, lobes triangular, acute or nerve excurrent into an awn (bristle), central *awn* geniculate, loosely twisted in lower third, ± as long as body of lemma; *callus* long, narrowly obtuse, hairy; *palea* hyaline (thinner than lemma), narrow-elliptic, rounded to emarginate, 2-keeled, 2-nerved, nerves prominent, hairy in upper half. **Lodicules** 2, glabrous. **Stamens** 3. **Ovary** glabrous; styles short, shortly plumose. **Fruit** an achene with free pericarp. $x = 7$.

Species 2, sthn Afr., S Namibia to Northern Cape.

Echinochloa P.Beauv. 9901120

(Panicoideae—Paniceae —Setariinae)

Palisot de Beauvois: 53 (1812); Stapf: 384 (1898); Stent: 263 (1924); Chippindall: 358 (1955); Launert: 69 (1970a); Clayton & Renvoize: 554 (1982); Clayton & Renvoize: 280 (1986); Clayton: 50 (1989); Gibbs Russell *et al.*: 119 (1990); Watson & Dallwitz: 354 (1994).

Annual or perennial, sometimes rhizomatous, tufted to decumbent or floating. **Leaf blade** usually expanded; *ligule* a fringe of hairs or 0. **Inflorescence** of few to many spike-like racemes crowded or scattered on central axis, racemes usually 1-sided and dense, sometimes spike-like, rachis triquetrous; *spikelets* paired or clustered on short branchlets forming (2–)4 or more rows, subsessile or shortly pedicelled, adaxial. **Spikelet** 1.5–7.0 mm long, dorsiventrally compressed, gibbous on one side and flat on other (plano-convex), ± hispidulous or hispid, rarely minutely softly hairy, cuspidate to awned, falling with glumes; *glumes* unequal, membranous; lower glume usually much smaller than upper, ovate, with a clasping base, usually distinctly 0–3-nerved, acute to acuminate, often mucronate; upper glume as long as spikelet, ovate, 5–7-nerved, nerves usually hispid, mucronate (cuspidate) or shortly awned. **Florets** 2; *lower floret* male or sterile; lemma similar to upper glume, 5-nerved, awnless or awned; *awn* as long as or up to 3 x as long as lemma, palea hyaline or 0; *upper floret* bisexual; *lemma* firmer than glumes, coriaceous, smooth and shiny, glabrous, convex, entire, margins inrolled and clasping only edges of palea, awnless; *palea* similar to lemma, indurated with infolded margins, acute tip briefly reflexed and ± protuberant between lemma margins. **Lodicules** 2, cuneate, fleshy. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose above. **Caryopsis** broadly ellipsoid, dorsally flattened. $x = 9$ (high polyploidy).

Species 30–40, tropical and warm temperate regions of the world; 9 in sthn Afr., widespread.

Ehrharta Thunb. 9901600

(Bambusoideae—Ehrharteae)

Thunberg: 217 (1779) name conserved; Stapf: 660 (1900); Stent: 275 (1924); Chippindall: 34 (1955); Clayton: 38 (1970); Launert: 39 (1971); Clayton & Renvoize: 76 (1986); Gibbs Russell: 62 (1987); Gibbs Russell & Ellis: 51 (1987); Gibbs Russell *et al.*: 121 (1990); Watson & Dallwitz: 361 (1994).

Annual or perennial, sometimes dwarf shrubs, rhizomatous or stoloniferous, sometimes with a bulb or corm, tufted or decumbent. **Leaf blade** linear to linear-lanceolate, expanded, folded or rolled, rarely much reduced; *ligule* a fringed or unfringed membrane, or a fringe of hairs. **Inflorescence** a panicle or reduced to a raceme with a few spikelets, or to a single spikelet, open or contracted, sometimes spike-like, rarely secund; *spikelets* solitary or sometimes clustered, pedicelled. **Spikelet** laterally to not noticeably compressed, disarticulating above glumes; *glumes* ± equal to unequal, shorter to longer than spikelet, membranous, similar, lanceolate or ovate-lanceolate, hairy or glabrous, 5-nerved, sometimes shortly mucronate, awnless. **Florets** 3; *lower* 2 *florets* sterile, reduced to lemmas, usually of similar size and differing from smaller bisexual lemma, occasionally first sterile lemma short and glume-like and second sterile lemma resembling bisexual lemma; sterile lemmas stiffly membranous, usually scabrid, one or both transversely rugose, tuberculate or smooth, hairy or glabrous, awnless or mucronate or awned from back or tapering into awn; *awn* longer or shorter than lemma body, sometimes bases of second sterile lemma and bisexual lemma coming together in a hinge-like joint resembling an earlobe, which may have a membranous appendage; *uppermost floret* bisexual; *lemma* firmer than glumes, smaller and more laterally compressed than sterile lemmas, 5–7-nerved, usually glabrous, rarely long-villous, sometimes mucronate, awnless; *callus* 0; *palea* linear or boat-shaped, almost as long as lemma, keeled, finely 2-nerved. **Lodicules** 2, large and flat, usually ovate or 2-lobed. **Stamens** 6 (5, 4, 3 or 1). **Ovary** obovoid; styles free, plumose or brush-like above. **Caryopsis** ellipsoid. $x = 12$ (polyploidy).

Species ± 35, sthn Afr. to Ethiopia, Indonesia to New Zealand; 22 in sthn Afr., mainly southern and western areas of the Cape region, a few widespread.

Eleusine Gaertn. 9903310

(Chloridoideae—Eragrostideae—Eleusininae)

Gaertner: 7 (1788); Stapf: 644 (1900); Stent: 291 (1924); Chippindall: 129 (1955); Launert: 74 (1970a); Phillips: 251 (1972); Phillips: 260 (1974); Clayton & Renvoize: 221 (1986); Gibbs Russell *et al.*: 129 (1990); Watson & Dallwitz: 364 (1994).

Annual or perennial, tufted, stoloniferous. **Leaf blade** linear, expanded or folded, strongly keeled, blunt at apex; sheaths keeled and margins free; *ligule* a fringed membrane, rarely an unfringed membrane. **Inflorescence** of 2–many spikes, digitate or subdigitate, sometimes a compact cluster; *spikelets* solitary, sessile or subsessile, arranged in 2 rows on one side of flattened rachis. **Spikelet** laterally compressed, disarticulating above glumes and between florets or not disarticulating; *glumes* very unequal, shorter than spikelet, keeled, scabrid on keels, awnless; lower glume 1-nerved; upper glume 3–7-nerved, herbaceous with membranous margins, narrowly winged on keel. **Florets** 2–15, bisexual or *uppermost floret* reduced; *lemmas* similar, membranous, glabrous, strongly keeled, keel sometimes thickened, 3-nerved, sometimes with 1–3 closely spaced additional nerves, lateral nerves often shorter than lemma, awnless to mucronate; *palea* slightly shorter lemma, notched at apex, 2-keeled with keels winged. **Lodicules** 2, minute, cuneate, glabrous. **Stamens** 3. **Ovary** glabrous; styles slender from a broadened base, distinct, plumose above. **Caryopsis** ellipsoid to subglobose, surface ornamented, enclosed in a free pericarp. $x = 9$ (polyploidy).

Species 9, mainly Africa; 4 in sthn Afr., widespread.

Elionurus Kunth ex Willd. 9900280

(Panicoideae—Andropogoneae—Rottboelliinae)

Willdenow: 901 (1806) as *Elyonurus*; Stapf: 332 (1898); Phillips & Bredell: 259 (1937); Clayton & Renvoize: 835 (1982); Clayton & Renvoize: 362 (1986); Gibbs Russell *et al.*: 130 (1990); Watson & Dallwitz: 366 (1994).

Perennial or annual, tufted, often aromatic. **Leaf blade** folded or flat; *ligule* a very short, fringed membrane or a

fringe of hairs. **Inflorescence** a solitary spike-like raceme, terminal or sometimes axillary forming a spatheate, leafy false panicle, racemes flexuous, dorsally flattened, internodes columnar to subclavate; joints oblique; *spikelets* in pairs, secund, in long-short combinations: one sessile, the other pedicelled, pedicels free of rachis. **Sessile spikelet** 5–15 mm long, lanceolate, dorsiventrally compressed, falling with glumes, hairy, sometimes sparsely hairy; *glumes* ± equal to unequal, dissimilar, awned to awnless; lower glume laterally 2-keeled, keels not winged, hairy or glabrous, usually bordered by a brown oil streak, entire or with a cuspidate to bifid tip; upper glume lanceolate, acute, membranous, 1-keeled, usually hairy. **Florets** 2; *lower floret* sterile, reduced to hyaline lemma; *upper floret* bisexual; *lemma* hyaline, less firm in texture than glumes, awnless; *callus* cuneate, large, hairy, hairs white or silver, less than half spikelet length; *palea* minute or 0. **Lodicules** 2, cuneate, fleshy, glabrous. **Stamens** 3. **Ovary** glabrous; styles plumose above. **Caryopsis** ellipsoid, dorsiventrally compressed.

Pedicelled spikelet well developed, acute to acuminate or with short awn-point, glabrous or hairy. **Florets** 2, male only or rarely reduced and sterile; lemma awnless. $x = 5, 10$.

Species 15, cosmopolitan, tropical and subtropical; 2 in sthn Afr.: *Elionurus muticus* (Spreng.) Kunth, widespread except Western Cape; and *E. tripsacoides* Willd., NE Namibia.

Elymandra Stapf 9900801

(Panicoideae—Andropogoneae—Anthistiriinae)

Stapf: 407 (1919); Clayton: 287 (1966b); Clayton & Renvoize: 823 (1982); Clayton & Renvoize: 357 (1986); Gibbs Russell *et al.*: 131 (1990); Watson & Dallwitz: 367 (1994).

Perennial or annual, tufted. **Leaf blade** linear, expanded, long, tapering to a fine apex; *ligule* an unfringed membrane, truncate. **Inflorescence** of paired or rarely solitary racemes long exserted from narrow spatheoles and gathered into a false panicle; raceme bases filiform, unequal, rarely deflexed; internodes and pedicels linear; racemes with 1–10 homogamous spikelet pairs; *spikelets* in pairs or triplets, usually in long-short combination but lower spikelet homogamous and sessile. **Sessile spikelet** linear-oblong, ± terete, falling with glumes; *glumes* ± equal, coriaceous, awned, dissimilar; lower glume rounded on back and sides, not grooved, obtuse or truncate, at length dark brown; upper glume 3-nerved, back rounded and grooved, obliquely awned. **Florets** 2; *lower floret* sterile, reduced to a hyaline lemma; *upper floret* bisexual; *lemma* hyaline, often with deeply bilobed apex; awned from sinus; *awn* stout, geniculate, column hairy; *callus* pungent; *palea* 0. **Lodicules** 2, glabrous, small. **Stamens** 3. **Ovary** glabrous; styles plumose, laterally exserted. **Caryopsis** narrowly ellipsoid.

Pedicelled spikelet male or sterile, narrowly lanceolate, ± as long as sessile spikelet, white-villous; *callus* well developed. $x = 10$.

Species ± 6, tropical Africa; 1 in sthn Afr.: *Elymandra grallata* (Stapf) Clayton, Namibia (Caprivi area) and N Botswana.

*__Elytrigia__ Desv. 9904345

(Pooideae—Triticeae)

Desvaux: 190 (1810); Dewey: 209 (1984); Löve: 484 (1984); Clayton & Renvoize: 150 (1986) included in *Elymus* L.; Gibbs Russell *et al.*: 132 (1990); Watson & Dallwitz: 370 (1994).

Perennial, tufted, stoloniferous. **Leaf blade** linear, expanded or rolled; *ligule* an unfringed membrane. **Inflorescence** a single spike, rachis not disarticulating; *spikelets* solitary, sessile to subsessile, alternately arranged (distichous), usually overlapping. **Spikelet** 10–20 mm long, disarticulating above or falling with glumes; *glumes* slightly shorter than spikelet, similar, ovate, oblong to lanceolate, awned. **Florets** 3–8(–10), bisexual, *uppermost floret* reduced; *lemma* blunt, 5-nerved, nerves confluent towards tip, shortly awned; *awn* straight; *palea* present. **Lodicules** 2, membranous, ciliate. **Stamens** 3. **Ovary** hairy. **Caryopsis** hairy at apex. $x = 7$ (high polyploidy).

Species ± 8, north and south temperate regions; 1 naturalised in sthn Afr.: **Elytrigia repens* (L.) Nevski, Western and Eastern Cape.

Elytrophorus P.Beauv. 9903700

(Arundinoideae—Arundineae)

Palisot de Beauvois: 67 (1812); Schweickerdt: 191 (1942); Chippindall: 186 (1955); Clayton: 135 (1970); Launert: 76 (1970a); Clayton & Renvoize: 170 (1986); Gibbs Russell *et al.*: 133 (1990); Watson & Dallwitz: 372 (1994).

Annual, tufted, hydrophytic. **Leaf blade** linear, expanded; *ligule* an unfringed to minutely fringed membrane. **Inflorescence** a false spike, with clusters of *spikelets* arranged in dense, globose clusters at intervals on a central axis or confluent and forming a cylinder; usually clusters subtended by enlarged, spreading glumes of lower spikelets, these linear and tapering into acuminate tips. **Spikelet** laterally compressed, disarticulating above glumes; *glumes* ± equal to slightly unequal, shorter than to as long as spikelet, lanceolate, membranous, glabrous, 1-nerved, keeled, acuminate to aristate, awned or awnless. **Florets** 2–6; *lower floret* bisexual; *uppermost floret* sterile or male; *lemma* 3-nerved, keeled, hairy or glabrous, short central awn present; *awn* straight, shorter than body of lemma; *palea* shorter than lemma, variously lobed at apex, 2-keeled, keels narrowly to broadly winged, wings entire or variously notched. **Lodicules** 1 or 2, glabrous. **Stamens** 1–3. **Ovary** glabrous; styles 2; stigmas scantily plumose. **Caryopsis** with free pericarp. $x = 13$.

Species 2–4, tropical Africa, Asia and Australia; 2 in sthn Afr., Namibia, Botswana and northern provinces of South Africa.

Enneapogon Desv. ex P.Beauv. 9903570

(Chloridoideae—Pappophoreae)

Palisot de Beauvois: 81 (1812); Stapf: 654 (1900); Stent: 293 (1924); Chippindall: 234 (1955); Renvoize: 393 (1968); Launert: 77 (1970a); Renvoize: 167 (1970); Launert: 145 (1971); Clayton & Renvoize: 189 (1986); Gibbs Russell *et al.*: 134 (1990); Watson & Dallwitz: 375 (1994).

Annual or perennial, (sometimes short-lived), densely tufted or rarely decumbent, sometimes rhizomatous. **Leaf blade** expanded or rolled, sometimes setaceous, hairs, when present, usually gland-tipped; sheaths in a few species sometimes enclosing cleistogenes; *ligule* a fringe of hairs. **Inflorescence** a panicle, usually contracted, often dense and spike-like, rarely open, feathery; *spikelets* subsessile or shortly pedicelled. **Spikelet** variably compressed, disarticulating above glumes; *glumes* unequal or ± equal, usually ± equal to spikelet, lanceolate, similar, membranous, 3–7-nerved, sometimes ciliate on nerves, frequently pilose, awnless. **Florets** 3–5; *lower florets* 1–3, bisexual; *upper floret* sterile or rudimentary, often reduced to a tuft of minute awns; *lemma* firmer than glumes, firm or leathery, not keeled, 9-lobed, scabrid or plumose below lobes, prominently 9-nerved, nerves excurrent into awns from tips of lobes; *awns* straight, glabrous, scabrous or hairy (plumose); *callus* short; *palea* linear or lanceolate, longer than lemma, sometimes ciliate on keels, hyaline. **Lodicules** 2, minute, fleshy, membranous. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose. $x = 9, 10$ (polyploidy).

Species ± 30, warm, dry regions of the world, especially Australia and Africa; ± 7 in sthn Afr., widespread.

Enteropogon Nees 9903000

(Chloridoideae—Cynodonteae—Chloridinae)

Nees ab Esenbeck: 448 (1836); Chippindall: 192 (1955); Clayton: 105 (1967c); Launert: 79 (1970a); Renvoize: 331 (1974); Clayton & Renvoize: 238 (1986); Gibbs Russell *et al.*: 136 (1990); Watson & Dallwitz: 376 (1994).

Perennial, rarely annual, robust, usually 400 or more mm tall, rarely less, tufted. **Leaf blade** long-linear, folded; *ligule* a short fringed membrane. **Inflorescence** terminal, of long, slender, 1-sided, spike-like racemes, these usually solitary, sometimes 2–8 present and digitate; *spikelets* solitary, sessile to subsessile, appressed to rachis in 2 rows. **Spikelet** 3–5 mm long, dorsiventrally compressed, disarticulating above glumes and between florets; *glumes* unequal, hyaline, 1-nerved, lanceolate, acuminate to acute, terminating in a short awn-point; lower glume ± half as long as upper. **Florets** 2–6; *lower floret* bisexual, *upper floret* sterile or reduced, remaining floret(s) male or sometimes bisexual; *lemma* firmer than glumes, membranous, lanceolate, rounded to flat on back, glabrous, 3-nerved, shortly 2-lobed, awned from between lobes; *awn* straight, glabrous; *callus* short, hairy; *palea* lanceolate, shortly 2-lobed, 2-keeled, concave between keels, minutely hairy on keels above. **Lodicules** 2. **Stamens** 3. **Ovary** oblong, glabrous; styles distinct, plumose above. **Caryopsis** ellipsoid. $x = 10$.

Species ± 6–17, tropical; 4 in sthn Afr., N Namibia, Botswana, northern provinces of South Africa and KwaZulu-Natal.

Entolasia Stapf 9901021

(Panicoideae—Paniceae—Setariinae)

Stapf: 739 (1920); Clayton & Renvoize: 573 (1982); Clayton & Renvoize: 278 (1986); Clayton: 46 (1989); Gibbs Russell *et al.*: 137 (1990); Watson & Dallwitz: 378 (1994).

Perennial, tufted or decumbent and rooting at nodes, sometimes with long creeping rhizomes. **Leaf blade** flat, papery; *ligule* a fringe of hairs. **Inflorescence** of spike-like racemes scattered up and appressed to central axis, or a contracted panicle; *spikelets* solitary, or paired. **Spikelet** 2.5–6.5 mm long, lanceolate-oblong, dorsiventrally compressed, falling with glumes; *glumes* unequal, dissimilar, awnless; lower glume a minute, nerveless, hyaline scale; upper glume membranous, similar to spikelet in shape and size, obscurely 3–7-nerved. **Florets** 2; *lower floret* sterile; lemma resembling upper glume, 5-nerved, awnless, palea 0; *upper floret* bisexual, *lemma* similar to firmer in texture than glumes, papery to membranous, obtuse, densely hairy, faintly 3–5-nerved, margins inrolled and clasping edges of palea, awnless; *palea* equalling lemma, 2-nerved. **Lodicules** 2, broadly cuneate. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose. **Caryopsis** ellipsoid, dorsiventrally compressed. $x = 9$.

Species 5, tropical Africa and E Australia; 2 in sthn Afr.: *Entolasia imbricata* Stapf and *E. olivacea* Stapf, N Namibia, Botswana and Northern Province.

Entoplocamia Stapf 9903280

(Chloridoideae—Eragrostideae—Uniolinae)

Stapf: 318 (1898); Stapf: 710 (1900); Chippindall: 189 (1955); Launert: 81 (1970a); Clayton & Renvoize: 201 (1986); Gibbs Russell *et al.*: 138 (1990); Watson & Dallwitz: 379 (1994).

Annual, tufted, robust. **Leaf blade** linear-lanceolate, expanded or rolled, glaucous; *ligule* a fringe of short hairs. **Inflorescence** a spike, raceme, or contracted panicle, sometimes spike-like, often in glomerate racemes; *spikelets* solitary or clustered, sessile or subsessile. **Spikelet** rather large, spiny, laterally compressed, becoming twisted when mature, disarticulating with glumes (spikelets falling whole); *glumes* unequal to ± equal, much shorter than spikelet, membranous, ovate, acuminate, hairy or glabrous, awnless; lower glume 3-nerved; upper glume 5-nerved. **Florets** few to many; *lower* 2 *florets* sterile and *uppermost floret* reduced, male or sterile; *remaining florets* bisexual, keeled, woolly at base near margins; sterile lemma 6–8-nerved; bisexual *lemma* firmer than glumes, 9–11-nerved in upper half, almost nerveless below, entire, hairy, mucronate to awned; *awn* straight, stout, deflexed, shorter than body of lemma; *palea* as long as lemma, shortly 2-lobed, 2-keeled, with keels winged and ciliate on back, woolly at base. **Lodicules** 0. **Stamens** 3. **Ovary** glabrous; styles connate at base, plumose above. **Caryopsis** ellipsoid. $x = 10$.

Species 1, Africa: *Entoplocamia aristulata* (Hack. & Rendle) Stapf, Namibia.

Eragrostis Wolf 9902860

(Chloridoideae—Eragrostideae—Eleusininae)

Wolf: 23 (1776); Stapf: 594 (1900); Stent: 296 (1924); De Winter: 132 (1955); Launert: 81 (1970a); Clayton: 188 (1974); Phillips: 133 (1982); Clayton & Renvoize: 215 (1986); Gibbs Russell *et al.*: 139 (1990); Watson & Dallwitz: 382 (1994).

Annual or perennial, tufted, sometimes geniculate, rooting at nodes, rhizomatous or stoloniferous, sometimes mat-forming, often glandular, particularly on leaf sheath and inflorescence. **Leaf blade** linear, expanded or rolled, rarely folded or setaceous; *ligule* a short fringe of hairs or a fringed membrane. **Inflorescence** a panicle or raceme, these open to very dense, contracted or spike-like; primary branches, especially lowermost, solitary, opposite, clustered or whorled on central axis; *spikelets* pedicelled or subsessile. **Spikelet** 1.5–26 mm long, usually laterally compressed, variously disarticulating: usually above glumes, either from apex downwards and rachilla falling with florets; or florets disarticulating from below upwards with rachilla remaining; or, rarely, entire spikelet falling with glumes (*E. superba*, *E. pilgeriana*); *glumes* equal or unequal, shorter than spikelet, usually membranous, 1- to rarely 3-nerved, keeled to not noticeably keeled, usually glabrous, awnless to rarely minutely mucronate or awned. **Florets** 2–many, rarely 1, bisexual or *uppermost floret* reduced; *lemmas* ± imbricate, similar to firmer in texture to glumes, membranous to chartaceous, ovate, elliptic to oblong or almost orbicular, entire or rarely deeply lobed, acute or obtuse, 3-nerved, laterals faint or occasionally suppressed, keeled or rounded, glabrous or rarely with stiff hairs or cilia on keels, rarely nerves (laterals and central) excurrent into short mucros or awns; *awn* straight; *palea* equal to, or shorter than lemma, glabrous, 2-keeled, sometimes gland-dotted, scabrous-ciliate or winged on keels, membranous. **Lodicules** 2 or 0, small, cuneate, ± fleshy. **Stamens** 1–3. **Ovary** glabrous; styles distinct, plumose. **Caryopsis** globose to ellipsoid, sometimes pericarp free. $x = 10$ (high polyploidy).

Species ± 350, cosmopolitan, mainly subtropical; ± 90 in sthn Afr., widespread.

Eriochloa Kunth 9901020

(Panicoideae—Paniceae—Setariinae)

Kunth: 94 (1816); Stent: 258 (1924); Chippindall: 369 (1955); Clayton & Renvoize: 568 (1982); Clayton & Renvoize: 285 (1986); Clayton: 84 (1989); Gibbs Russell *et al.*: 164 (1990); Watson & Dallwitz: 393 (1994).

Perennial or annual. **Leaf blade** linear, expanded, tapering to a fine point; *ligule* a reduced fringed mem-

brane or fringe of hairs. **Inflorescence** of few to many spike-like racemes arranged on a central axis, or paniculate; *spikelets* either solitary, in pairs, or in short clusters, supported on a bead-like swelling. **Spikelet** lanceolate to elliptic, dorsiventrally compressed, acute to aristate, falling with glumes; *glumes* usually unequal, dissimilar; lower glume reduced or apparently absent; upper glume as long as spikelet, ovate-elliptic, 5-nerved, glabrous or hairy, mucronate or usually shortly awned. **Florets** 2; *lower floret* sterile or male; lemma similar in shape and texture to upper glume; palea similar to lemma or reduced, or 0; *upper floret* bisexual; *lemma* firmer than glumes, elliptic with inflexed margins, finely rugose, 5-nerved, glabrous, abruptly mucronate, awned or awnless; *awn* straight, shorter than body of lemma; *palea* elliptic, obtuse with inflexed margins. **Lodicules** 2, broadly cuneate, sometimes somewhat suppressed. **Stamens** 3. **Ovary** glabrous; styles distinct or united at base, plumose. **Caryopsis** oblong-ellipsoid, dorsiventrally compressed, obtuse. $x = 9$ (high polyploidy).

Species 30, tropics; 5 in sthn Afr., Namibia, Botswana, North-West, Mpumalanga, Swaziland and KwaZulu-Natal.

Eriochrysis P.Beauv. 9900420

(Panicoideae—Andropogoneae—Saccharinae)

Palisot de Beauvois: 8 (1812); Stapf: 321 (1898) under *Saccharum* L.; Stapf: 91 (1917); Chippindall: 475 (1955); Clayton & Renvoize: 706 (1982); Clayton & Renvoize: 331 (1986); Gibbs Russell *et al.*: 165 (1990); Watson & Dallwitz: 395 (1994).

Perennial, tufted. **Leaf blade** narrow, usually expanded; *ligule* a long-fringed membrane or fringe of hairs. **Inflorescence** contracted, fulvous or rufous, of several short, spike-like racemes ± appressed along elongated central axis; rachis fragile, internodes and pedicels linear to clavate; *spikelets* paired, in long-short combinations: one sessile, the other pedicelled, pedicels free. **Sessile spikelet** deciduous with contiguous joint of rachis and pedicel, dorsiventrally compressed, falling with glumes, elliptic; *glumes* ± equal, hairy, dissimilar; lower glume indurated, broadly rounded on back, ± 2-keeled with inflexed margins, nerves generally indistinct; upper glume thinner, not 2-keeled, 1–3-nerved. **Florets** 2; *lower floret* reduced to a hyaline, lanceolate lemma, awnless; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, muticous or mucronate; *callus* short, truncate, hairy, hairs usually tawny, half as long as to longer than spikelet; *palea* small, hyaline, nerveless. **Lodicules** 2, cuneate. **Stamens** 3. **Ovary** glabrous; styles 2, plumose. **Caryopsis** ellipsoid.

Pedicelled spikelet slightly smaller than sessile one, deciduous with pedicel, female; palea small. $x = 10$.

Species 7, Africa and tropical America, 1 species in India; 2 in sthn Afr., N Botswana, northern provinces of South Africa, Swaziland, KwaZulu-Natal and Northern Cape.

Eulalia Kunth 9900530

(Panicoideae—Andropogoneae—Saccharinae)

Kunth: 160 (1829); Stapf: 324 (1898) under *Pollinia* Trin.; Chippindall: 485 (1955); Clayton & Renvoize: 711 (1982); Clayton & Renvoize: 333 (1986); Gibbs Russell *et al.*: 166 (1990); Watson & Dallwitz: 401 (1994).

Perennial or annual, tufted, erect, often decumbent, rhizomatous. **Leaf blade** linear, convolute at first, becoming expanded, gradually passing into sheath; *ligule* an unfringed to a fringed membrane. **Inflorescence** of 2–many, terminal, spike-like, hairy (silky) racemes, digitate or subdigitate or scattered on a central axis, dense with spikelets closely packed; internodes and pedicels linear, slender; *spikelets* similar, in pairs, in long-short combinations: one sessile, the other pedicelled, pedicels free and hairy. **Spikelet** dorsiventrally compressed, falling with glumes; *glumes* ± equal, dissimilar, hairy, usually awnless; lower glume concave to ± flattened, with inflexed margins, hairy or glabrous, nerveless or faintly 2- or 3-nerved, 2-keeled; upper glume often narrower, keeled, acute. **Florets** 2; *lower floret* reduced to a lemma, sometimes a small scale or 0, awnless; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, linear to cordate, 2-lobed, awnless or awned from between lobes; *awn* geniculate, twisted; *callus* obtuse, hairy; *palea* small, hyaline or 0. **Lodicules** 2, fleshy. **Stamens** 3. **Ovary** glabrous; styles 2, plumose. **Caryopsis** oblong. $x = 5, 10$ (polyploidy).

Species ± 30, tropical and subtropical regions of Africa, Asia and Australia; 2 in sthn Afr., Mpumalanga, Swaziland to KwaZulu-Natal and southwards to Eastern Cape.

Eustachys Desv. 9903020

(Chloridoideae—Cynodonteae—Chloridinae)

Desvaux: 188 (1810); Stapf: 643 (1900); Chippindall: 194 (1955); Launert: 116 (1970a); Renvoize: 335 (1974); Clayton & Renvoize: 237 (1986); Gibbs Russell *et al.*: 167 (1990); Watson & Dallwitz: 404 (1994).

Perennial, tufted, rhizomatous, sometimes geniculate. **Culms** often strongly compressed. **Leaf blade** linear, flat, folded, keeled, usually obtuse; sheaths strongly keeled, flabellate; *ligule* a fringe of hairs. **Inflorescence** of 2–many, 1-sided spikes, digitate; *spikelets* densely packed in two rows on rachis; spikelets solitary, sessile. **Spikelet** dark to golden brown, laterally compressed, disarticulating above glumes, obovate; *glumes* unequal, dissimilar, shorter than spikelet, ± boat-shaped, membranous, glabrous; lower glume obliquely ovate, obtuse, awnless; upper glume elliptic, obtuse to bilobed, keeled, awned from below apex with awn up to half as long as body of glume. **Florets** 2 or 3; *lower floret* bisexual; *upper floret* sterile, rarely male, lemma cuneate, truncate; rachilla terminating in a little clavate lemma; lemmas dissimilar, 2- to 3-nerved, brown to blackish, *lower lemma* broadly elliptic, ovate, or elliptic-oblong, keeled, long-hairy on margins and nerves, shortly 2-lobed, without mucro or awn, or mucronate or awned from below apex; *awn* short; *palea* ± same length as lemma, oblanceolate, 2-keeled, of same texture or thinner than lemma. **Lodicules** 2, minute. **Stamens** 3. **Ovary** glabrous; style distinct, plumose. **Caryopsis** plump, obovoid. $x = 10$ (polyploidy).

Species 10, tropics, mostly America; 1 in sthn Afr.: *Eustachys paspaloides* (Vahl) Lanza & Mattei, widespread.

Festuca L. 9904170

(Pooideae—Poeae)

Linnaeus: 73 (1753); Stapf: 719 (1900); Chippindall: 53 (1955); Clayton: 56 (1970); Launert: 54 (1971); Clayton & Renvoize: 93 (1986); Linder: 61 (1986); Gibbs Russell *et al.*: 168 (1990); Watson & Dallwitz: 409 (1994).

Pseudobromus K.Schum.: 108 (1895); Clayton: 53 (1970).

Annual or perennial, tufted or decumbent, rhizomatous; sometimes dioecious. **Leaf blade** expanded, folded or rolled, linear to linear-lanceolate, often auricled; sheaths often splitting into fibres at base with age; *ligule* an unfringed membrane, often conspicuous. **Inflorescence** an open or contracted panicle, sometimes spike-like; *spikelets* solitary, not secund, pedicelled. **Spikelet** 6–20 mm long, laterally compressed, disarticulating above glumes, rachilla extension present; *glumes* unequal, shorter than spikelet, similar, membranous, awnless, lanceolate to ovate-lanceolate, acute or obtuse, 1–3-nerved or upper glume (1-)3–5-nerved, keeled to

rounded, often scabrid on keel. **Florets** (rarely 1)2–14, bisexual or *uppermost floret* reduced and sterile; *lemma* 3.5–11.0 mm long, similar to firmer than glumes, lanceolate, rounded on back, at least at base, membranous, usually glabrous, rarely shortly hairy, 3–7-nerved, tip firm, acute, entire, awnless or awned at apex or rarely below; *awn* straight, usually shorter than body of lemma; *palea* ± equal to lemma, lanceolate, 2-keeled, almost hyaline, keels ± scaberulous. **Lodicules** 2, unequally 2-lobed, hyaline. **Stamens** 3. **Ovary** minutely hairy upwards or only at apex, rarely glabrous; styles distinct, very short, terminal or subterminal, plumose. $x = 7$ (high polyploidy).

Species ± 450, temperate areas throughout the world, extending through tropics on mountain tops; 9 in sthn Afr., mainly high eastern regions.

Fingerhuthia Nees 9903710

(Chloridoideae—Eragrostideae—Uniolinae)

Nees ab Esenbeck: 7 (1834); Stapf: 690 (1900); Stent: 294 (1924); Chippindall: 206 (1955); Launert: 116 (1970a); Clayton & Renvoize: 201 (1986); Gibbs Russell *et al.*: 171 (1990); Watson & Dallwitz: 413 (1994).

Perennial, rarely annual in desert areas, tufted, rhizomatous. **Leaf blade** long-linear, expanded or folded; *ligule* a fringe of long hairs. **Inflorescence** a compact, cylindric, spike-like panicle, usually oblong in outline, central axis terete; *spikelets* solitary, pedicelled, pedicels remaining after spikelets have fallen. **Spikelet** 4–6 mm long, strongly laterally compressed, disarticulating with glumes; *glumes* ± equal, longer than spikelet, similar, membranous, lanceolate, 1-nerved, sparsely to densely hairy on keels, shortly awned or mucronate. **Florets** 2–4; *lowest floret* bisexual; *remaining florets* male, sterile or reduced; *lower lemma* lanceolate or linear-oblong, similar to firmer in texture to glumes, membranous, glabrous or hairy, (3)-5–7-nerved, keeled, entire, apex rounded or acuminate, shortly awned or mucronate; uppermost lemma smaller; *palea* slightly shorter than lemma, ovate-lanceolate, membranous. **Lodicules** 2, cuneate. **Stamens** 3. **Ovary** slightly constricted below apex, glabrous; styles distinct, finely plumose. **Caryopsis** ellipsoid. $x = 10$ (polyploidy).

Species 2, Afghanistan, Arabian Peninsula, sthn Afr.; 2 in sthn Afr., widespread.

*Gastridium P.Beauv. 9902480

(Pooideae—Aveneae—Alopecurinae)

Palisot de Beauvois: 21 (1812); Chippindall: 96 (1955); Hubbard: 100 (1970); Tutin: 236 (1980); Clayton & Renvoize: 138 (1986); Gibbs Russell *et al.*: 172 (1990); Watson & Dallwitz: 416 (1994).

Annual. **Leaf blade** linear, flat; *ligule* an unfringed membrane. **Inflorescence** a contracted or spike-like panicle, often cylindrical; *spikelets* unequally pedicelled, pedicel with a thickened tip. **Spikelet** linear-oblong, laterally compressed, rachilla produced as a fine hairy bristle or not produced; *glumes* unequal, longer than spikelet, dissimilar, lanceolate, usually membranous above and indurated at base, swollen and rounded on back near base, keeled above, 1-nerved, acuminate. **Floret** 1, bisexual, *lemma* elliptic, rounded dorsally, less firm than glumes, hyaline, finely 5-nerved, hairy, awned from back; *awn* capillary, geniculate and twisted in lower half, much longer than body of lemma; *palea* as long as lemma, elliptic, 2-lobed, 2-nerved, pilose dorsally. **Lodicules** 2, hyaline, glabrous. **Stamens** 3. **Ovary** subglobose, glabrous; styles plumose. **Caryopsis** ellipsoid. $x = 7$.

Species 2, mainly Mediterranean; 1 naturalised in sthn Afr.: **Gastridium phleoides* (Nees & Meyen) C.E.Hubb., Western Cape.

Hackelochloa Kuntze 9900220

(Panicoideae—Andropogoneae—Rottboelliinae)

Kuntze: 776 (1891); Chippindall: 523 (1955); Veldkamp *et al.*: 281 (1986); Clayton & Renvoize: 847 (1982); Clayton & Renvoize: 366 (1986); Gibbs Russell *et al.*: 172 (1990); Watson & Dallwitz: 438 (1994).

Annual, tufted. **Leaf blade** linear-lanceolate, expanded, ± cordate at base; *ligule* a fringed membrane. **Inflorescence** of many, solitary racemes aggregated into a spatheate false panicle, racemes dorsally compressed, internodes flattened, oblong and fused to adjacent pedicels, disarticulating obliquely; *spikelets* in pairs, in long-short combinations: one sessile, the other pedicelled, appearing sessile due to fusion of pedicel with rachis. **Sessile spikelet** falling with glumes, globose; *glumes* ± equal, dissimilar, awnless; lower glume hemispherical, cartilaginous, globose, rugose, conspicuously pitted or tuberculate, wingless; upper glume ovate-lanceolate, smooth, partly adhering to enclosing internode. **Florets** 2; *lower floret* sterile, reduced to a small hyaline lemma, awnless; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, much shorter than glumes, entire, glabrous, awnless; *callus* obliquely truncate with a central boss; *palea* hyaline, similar to lemma. **Lodicules** 2, fleshy, broadly cuneate. **Stamens** 3. **Ovary** glabrous; styles distinct, short, plumose. **Caryopsis** oblate, slightly dorsally flattened.

Pedicelled spikelet slightly longer than sessile spikelet, ovate, narrowly winged, bisexual, male or sterile; lower lemma present or 0, pedicel scarcely distinguishable from internode. $x = 7$.

Species 2, tropics, Africa, India, S China and S United States of America; 1 in sthn Afr.: *Hackelochloa granularis* (L.) Kuntze, Mpumalanga.

*Hainardia Greuter 9904423

(Pooideae—Hainardieae)

Greuter: 178 (1967); Clayton & Renvoize: 111 (1986); Gibbs Russell *et al.*: 173 (1990); Watson & Dallwitz: 440 (1994).

Monerma of authors, a superfluous name for *Lepturus* R.Br.; Chippindall: 73 (1955).

Annual, tufted. **Leaf blade** expanded or rolled; *ligule* an unfringed membrane. **Inflorescence** a single cylindrical spike on a hard, articulated rachis, rachis fragile; *spikelets* edgeways on, alternating and sunk into rachis but longer than internodes, solitary. **Spikelet** dorsiventrally compressed, falling with glumes; *lower glume* suppressed except on terminal spikelets, *upper glume* 5–8 mm long, as long as spikelet, abaxial, 3–7(9)-nerved, glabrous, awnless. **Floret** 1, bisexual; *lemma* less firm than glumes, membranous, glabrous, 3-nerved, laterals short, awnless; *palea* present. **Lodicules** 2, membranous, glabrous. **Stamens** 1–3. **Ovary** glabrous. **Caryopsis** oblong, somewhat dorsally compressed with an appendage at apex. $x = 13$ (polyploidy).

Species 1, Mediterranean region: **Hainardia cylindrica* (Willd.) Greuter, naturalised in coastal districts of the southern and Eastern Cape regions.

Harpochloa Kunth 9902980

(Chloridoideae—Cynodonteae—Chloridinae)

Kunth: 92 (1829) as *Harpechloa*; Stapf: 639 (1900) as *Harpechloa*; Chippindall: 191 (1955) as *Harpechloa*; Pilger: 101 (1956); Clayton & Renvoize: 241 (1986); Gibbs Russell *et al.*: 174 (1990); Watson & Dallwitz: 444 (1994).

Perennial, densely tufted, rhizomatous. **Culms** flattened. **Leaf blade** stiff, linear, expanded, folded or rolled, strongly keeled; *ligule* a minute, fringed membrane. **Inflorescence** a solitary (rarely 2), 1-sided spike; rachis

pubescent or woolly; *spikelets* solitary, sessile, arranged in 2 rows on abaxial face of rachis. **Spikelet** laterally compressed, darkly pigmented, disarticulating above glumes, not between florets; *glumes* unequal, dissimilar, membranous or subcoriaceous, awnless; lower glume less than half as long as upper glume, 1-keeled, 1-nerved; upper glume ± as long as spikelet, boat-shaped, somewhat falcate, 3-nerved, 2-keeled, scabrid on keels. **Florets** 2–4; *lowest floret* bisexual; *second* and *third* male, *fourth floret*, if present, sterile; lemmas dissimilar, decreasing in size upwards, 3-nerved, awnless, *lowest lemma* sharply folded along keel, membranous, elliptic or elliptic-oblong, obtuse, long-hairy on nerves and margins, upper lemma obovate or spathulate, rounded or almost truncate above, with 2 marginal nerves, glabrous; *palea* equalling or slightly longer than lemma, lanceolate or linear-lanceolate, hairy near tip. **Lodicules** cuneate, fleshy, narrowly 2-winged. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose. **Caryopsis** ellipsoid, trigonous. $x = 10$ (polyploidy).

Species ± 2; 1 in sthn Afr.: *Harpochloa falx* (L.f.) Kuntze, northern provinces of South Africa, Swaziland, Free State, KwaZulu-Natal, Western and Eastern Cape.

Helictotrichon Besser 9901970

(Pooideae—Aveneae—Aveninae)

Besser: 526 ['326'] (1827); Stapf: 472 (1899) under *Avenastrum* Jess.; Stent: 284 (1924) under *Avenastrum* Jess.; Schweickerdt: 185 (1937); Phillips: 118 (1951); Chippindall: 76 (1955); Clayton: 86 (1970); Sevenster & Veldkamp: 329 (1983); Clayton & Renvoize: 123 (1986); Gibbs Russell *et al.*: 175 (1990); Watson & Dallwitz: 446 (1994).

Perennial, tufted. **Leaf blade** linear, expanded or folded, sometimes setaceous; *ligule* a hyaline or scarious, unfringed membrane. **Inflorescence** a narrow panicle, contracted or open, erect or nodding; *spikelets* solitary, pedicelled. **Spikelet** large, 7–30 mm long, laterally compressed, disarticulating above glumes and between florets; *glumes* ± equal or unequal, usually shorter than spikelet, hyaline or subhyaline, acute or acuminate or shortly awned, ± keeled; lower glume 1–3-nerved; upper glume 3(–7)-nerved. **Florets** 2–6, bisexual; *uppermost floret* male, sterile or reduced; rachilla hairy, rarely glabrous, sometimes produced into a short bristle beyond uppermost floret; *lemma* firmer than glumes, firmly membranous to leathery with scarious or hyaline tips, glabrous, rounded on back, acute or acuminate, 5–11-nerved, 2-lobed (rarely 4-lobed), lobes awnless or awned; central *awn* from upper part of back between lobes, awn longer than body of lemma, geniculate and twisted, or slightly so; *callus* hairy; *palea* shorter than lemma, 2-keeled, ciliate. **Lodicules** 2, large, hyaline. **Stamens** 3. **Ovary** hairy from above middle or at apex only; styles distinct, short, plumose. $x = 7$ (high polyploidy).

Species ± 100, mainly temperate Eurasia, but extending across the tropical mountains to temperate regions throughout the world; ± 12 in sthn Afr., northern provinces of South Africa, Swaziland, Free State, KwaZulu-Natal, Lesotho, Western and Eastern Cape.

Hemarthria R.Br. 9900210

(Panicoideae—Andropogoneae—Rottboelliinae)

Brown: 207 (1810); Stapf: 328 (1898) under *Rottboellia* L.f. subgen. *Hemarthria* (R.Br.) Hack.; Chippindall: 19 (1955); Clayton & Renvoize: 851 (1982); Clayton & Renvoize: 363 (1986); Gibbs Russell *et al.*: 178 (1990); Watson & Dallwitz: 448 (1994).

Perennial, decumbent or rambling, rhizomatous, stoloniferous. **Leaf blade** linear to linear-lanceolate, usually flat; *ligule* a short, fringed membrane. **Inflorescence** of solitary spike-like racemes in a spatheate, leafy, false panicle, dorsiventrally compressed, tough, arising from subtending sheaths; internodes clavate, usually disarticulating obliquely; *spikelets* in pairs, secund, in long-short combinations: one sessile, the other pedicelled but appearing sessile owing to pedicel being fused with adjacent internode of rachis, spikelets sunk in a concave hollow on inner surface of rachis, thus inflorescence appears culm-like. **Sessile spikelet** dorsiventrally compressed, lanceolate, glabrous, falling with glumes; *glumes* ± equal, dissimilar, awnless; lower glume obtuse to emarginate, 2-keeled, keels not winged, many-nerved; upper glume obtuse to long-acuminate, membranous. **Florets** 2; *lower floret* sterile, reduced to a hyaline lemma, awnless; *upper floret* bisexual; *lemma* lanceolate, less firm than glumes, hyaline, entire, glabrous, awnless; *callus* obtuse to cuneate, rarely truncate; *palea* similar to lemma. **Lodicules** 2, fleshy, cuneate, glabrous. **Stamens** 3. **Ovary** ellipsoid, glabrous; styles erect, plumose. **Caryopsis** narrowly obovoid, slightly dorsiventrally compressed.

Pedicelled spikelet similar to sessile spikelet, bisexual; callus 0; pedicel flattened, broadly linear, fused to internode. $x = 9, 10$ (polyploidy, B-chromosomes).

Species 12, tropical and subtropical regions of Old World, also in America; 1 in sthn Afr.: *Hemarthria altissima* (Poir.) Stapf & C.E.Hubb., widespread except Namibia.

Heteropogon Pers. 9900800

(Panicoideae—Andropogoneae—Anthistiriinae)

Persoon: 533 (1807); Stapf: 350 (1898) under *Andropogon* L.; Stent: 252 (1924); Chippindall: 492 (1955); Clayton & Renvoize: 825 (1982); Clayton & Renvoize: 359 (1986); Gibbs Russell *et al.*: 178 (1990); Watson & Dallwitz: 457 (1994).

Perennial or annual, tufted, rhizomatous. **Leaf blade** narrowly linear, expanded; *ligule* an unfringed or a fringed membrane. **Inflorescence** a solitary, spike-like raceme, terminal or in axils, sometimes loosely aggregated into a false leafy panicle; racemes linear with spikelet pairs in lower quarter or three-quarters homogamous (alike in sex and shape), spikelet pairs in upper portion heterogamous (differing in sex and shape); internodes linear; *spikelets* paired, one sessile, the other pedicelled but pedicel reduced to short stump, spikelets being supported on a long *callus*. **Sessile spikelet** 5.5–11 mm long, subterete to terete, coriaceous; *glumes* ± equal, dissimilar, awnless; lower glume linear, obtuse, flat or rounded on back, hairy; upper glume linear, acute, prominently keeled. **Florets** 2, *lower floret* reduced to a lemma, hyaline, awnless; *upper floret* bisexual or female in heterogamous pair, or sterile in homogamous pair; *lemma* less firm than glumes, hyaline at base, entire, stipiform, passing into a stout hairy, geniculate *awn*; *callus* long, pungent, hairy; *palea* 0. **Lodicules** large or somewhat reduced. **Stamens** 0–3. **Ovary** oblong, glabrous; styles plumose. **Caryopsis** lanceolate, channelled on one side.

Pedicelled spikelet lanceolate, dorsally flattened, somewhat asymmetrical, larger than sessile spikelet, male or sterile, awnless, with long slender callus functioning as a pedicel, true pedicel reduced to a stump. $x = 10$ (11) (high polyploidy).

Species ± 6, tropical and subtropical regions; 2 in sthn Afr.: *Heteropogon contortus* (L.) Roem. & Schult., widespread, and *H. melanocarpus* (Ell.) Benth., Namibia, Botswana and northern parts of Northern Province.

Holcus L. 9901920

(Pooideae—Aveneae—Aveninae)

Linnaeus: 1047 (1753) name conserved; Stapf: 464 (1899); Stent: 284 (1924); Chippindall: 87 (1955); Tutin: 230 (1980); Clayton & Renvoize: 130 (1986); Gibbs Russell *et al.*: 180 (1990); Watson & Dallwitz: 464 (1994).

Annual or perennial, tufted. **Leaf blade** linear, expanded, pubescent or pilose; *ligule* an unfringed or fringed membrane. **Inflorescence** a panicle, contracted, often dense, sometimes almost spike-like, oblong or interrupted; *spikelets* solitary, pedicelled, pedicel terete, pilose. **Spikelet** laterally compressed, falling with glumes; *glumes* ± equal, ± as long as to longer than spikelet, membranous, dissimilar, keeled; lower glume lanceolate, hairy on keels and margins, 1–3-nerved, awned; awn half as long as body of glume; upper glume larger, elliptic-lanceolate or ovate, 3-nerved, with 2 prominent lateral nerves, hairy on keel and margins, shortly mucronate or awned; awn as long as body of glume. **Florets** 2, a brief rachilla extension often present; *lower floret* bisexual; *lemma* firmer in texture than glumes, shiny, ovate, rounded on back, obscurely 3–5-nerved, obtuse or acute, awnless; *upper floret* specialised in form, male or sterile, lemma shorter to ± as long as lower lemma, lanceolate, hyaline or membranous, glabrous, awned from back near apex; *awn* short, stout, hooked, usually geniculate, slightly twisted; *palea* smaller than lemma, narrow-lanceolate. **Lodicules** 2, delicate. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose above. **Caryopsis** narrowly ellipsoid. $x = 4, 7$ (polyploidy).

Species 6, Europe, North Africa and Middle East; ± 2 in sthn Afr., 1 endemic: *Holcus setiger* Nees, 1 naturalised: **H. lanatus* L., northern provinces of South Africa, KwaZulu-Natal, Eastern and Western Cape.

Hordeum L. 9904510

(Pooideae—Triticeae)

Linnaeus: 84 (1753); Stapf: 464 (1899); Chippindall: 71 (1955); Bothmer *et al.*: 539 (1980); Humphries: 204 (1980); Dewey: 209 (1984); Löve: 435 (1984); Clayton & Renvoize: 154 (1986); Gibbs Russell *et al.*: 180 (1990); Watson & Dallwitz: 471 (1994).

Annual or perennial, tufted or culm solitary, sometimes geniculate. **Leaf blade** linear, expanded; *ligule* an unfringed membrane. **Inflorescence** a dense, bristly false spike; rachis usually fragile (tough in cultivated forms); *spikelets* in groups of 3, triads falling together as unit, 2 laterals pedicelled, central one sessile or pedicelled, usually all awned, rarely one lateral spikelet absent or represented by 2 glumes only. **Central spikelet** laterally to dorsiventrally compressed; *glumes* side by side, linear-lanceolate, 1–3-nerved, awned and bristle-like. **Floret** 1, bisexual, rachilla extension present; *lemma* lanceolate, membranous, rounded on back, acuminate to awned, glabrous, usually obscurely 5-nerved, awned; *awn* scabrid; *palea* ± as long as lemma, lanceolate, acute or truncate, sometimes bidentate, membranous. **Lodicules** 2, lanceolate, ciliate or ciliolate, hyaline. **Stamens** 3. **Ovary** villous above; styles distinct, plumose.

Lateral spikelet sterile or male; usually smaller than central spikelet, often reduced to awns; lemma, if present, awnless to awned, often with a rachilla extension; glumes bristle-like and long-awned, often ciliate. $x = 7$ (polyploidy).

Species ± 40, temperate regions throughout the world; 5 in sthn Afr., 1 indigenous: *Hordeum capense* Thunb., North-West, Lesotho, Northern, Western and Eastern Cape.

Hyparrhenia Fourn. 9900730

(Panicoideae—Andropogoneae—Anthistiriinae)

Fournier: 51 (1886); Stapf: 336 (1898) under *Andropogon* L.; Chippindall: 509 (1955); Clayton: 38 (1969); Clayton & Renvoize: 788 (1982); Clayton & Renvoize: 354 (1986); Gibbs Russell *et al.*: 182 (1990); Watson & Dallwitz: 483 (1994).

Perennial, rarely annual, tufted and erect, forming tussocks, rarely trailing, rhizomatous, never aromatic. **Leaf blade** linear, usually flat, rarely folded; *ligule* a scarious unfringed membrane, truncate or rounded. **Inflorescence** of paired, short racemes enclosed by a spatheole; this crowded into a large leafy false panicle; racemes short, with 1 or 2 homogamous pairs of spikelets at base of lower raceme and 0–2 at base of upper raceme, these spikelets male or barren, awnless, raceme-bases flattened or terete, sometimes deflexed at maturity, pedicels and internodes linear; *spikelets* in pairs, in long-short combination: one sessile, the other pedicelled. **Sessile spikelet** narrowly lanceolate to lanceolate-oblong, dorsiventrally compressed or terete, hairy or glabrous; *glumes* ± equal, very dissimilar; lower glume as long as spikelet, lanceolate, truncate or acute, rarely produced into 2 short awns, broadly rounded or flattened on back; upper glume obtuse to acute or mucronate, awnless. **Florets** 2; *lower floret* sterile, reduced to a lemma, awnless; *upper floret* bisexual; *lemma* stipiform, less firm than glumes towards base, hyaline, 2-lobed, awned; *awn* stout, geniculate, column hairy, twisted; *callus* blunt to pungent, hairy, applied obliquely to apex of internode with its tip free; *palea* 0 or reduced. **Lodicules** 2, cuneate, truncate or emarginate. **Stamens** 3. **Ovary** glabrous. **Caryopsis** oblong.

Pedicelled spikelet 3–8(–10) mm long, usually longer than sessile spikelet, narrowly lanceolate, acute, hairy or glabrous, male or sterile; callus 0; lower glume awnless or awned; upper glume awnless. $x = 10, 15$ (polyploidy).

Species ± 55, mostly in Africa, few species in other tropical regions and the Mediterranean; 20 in sthn Afr., widespread.

Hyperthelia Clayton 9900731

(Panicoideae—Andropogoneae—Anthistiriinae)

Clayton: 438 (1966c); Chippindall: 510 (1955) under *Hyparrhenia* Fourn.; Clayton & Renvoize: 786 (1982); Clayton & Renvoize: 356 (1986); Gibbs Russell *et al.*: 188 (1990); Watson & Dallwitz: 485 (1994).

Perennial, tufted. **Leaf blade** linear, expanded; *ligule* an unfringed to rarely a fringed membrane. **Inflorescence** of few to many spike-like, paired racemes embraced or subtended by a linear to lanceolate spatheole in a leafy spatheate false panicle, raceme-pairs with (1)2(–10) sessile spikelets per pair, 1 pair of homogamous spikelets at base of lower raceme; raceme bases unequal, terete, sometimes deflexed, apex oblique, produced into a long scarious appendage, internodes and pedicels linear; *spikelets* paired, in long-short combination: one sessile, the other pedicelled, dissimilar. **Sessile spikelet** dorsiventrally compressed, narrow-oblong to narrow-lanceolate, falling with glumes; *glumes* ± equal, very dissimilar, coriaceous; lower glume with a shallow median groove, otherwise rounded on back and sides, shortly hairy; upper glume acute to apiculate, with or without an awn. **Florets** 2; *lower floret* reduced to a lemma, hyaline, awnless; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, shortly 2-lobed, awned from between lobes; *awn* robust, geniculate, hairy; *callus* pungent, hairy; *palea* 0 or reduced. **Lodicules** 2, glabrous. **Stamens** 3. **Ovary** ovoid, glabrous; styles plumose. **Caryopsis** narrowly ellipsoid.

Pedicelled spikelet 9–14 mm long, ± as long as sessile spikelet, male, awnless or aristulate, narrowed at base to an indistinct callus. $x = 10$.

Species 6, tropical and sthn Afr., introduced to tropical America; 1 in sthn Afr.: *Hyperthelia dissoluta* (Nees ex Steud.) Clayton, N Namibia, Botswana, northern provinces of South Africa, Swaziland and KwaZulu-Natal.

Imperata Cirillo 9900370

(Panicoideae—Andropogoneae—Saccharinae)

Cirillo: 26 (1792); Stapf: 320 (1898); Chippindall: 476 (1955); Clayton & Renvoize: 700 (1982); Clayton & Renvoize: 333 (1986); Gibbs Russell *et al.*: 189 (1990); Watson & Dallwitz: 491 (1994).

Perennial, strongly rhizomatous. **Leaf blade** narrow, leaves mainly basal; *ligule* a fringed membrane. **Inflorescence** a narrow, silky, white or silvery, often spiciform panicle, branches of many very short racemes, rachis tough; *spikelets* paired, similar, unequally pedicelled, similar, each supported on a slender pedicel. **Spikelet** lanceolate to oblong, ± terete, enveloped in long hairs from callus and glumes; *glumes* equal, similar, as long as spikelet, membranous, long, silky, hairy towards base, awnless. **Florets** 2; *lower floret* sterile, rarely male, reduced to a hyaline lemma, shorter than spikelet, awnless; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, lanceolate to oblong, shorter than spikelet, glabrous, awnless; *callus* short, truncate, hairy with long, white or silvery, silky hairs almost concealing spikelet; *palea* present or reduced. **Stamens** 1 or 2. **Ovary** glabrous. **Caryopsis** ellipsoid. $x = 5$, 10 (polyploidy).

Species 8, cosmopolitan in tropical and subtropical regions; 1 in sthn Afr.: *Imperata cylindrica* (L.) Raeusch., widespread.

Ischaemum L. 9900100

(Panicoideae—Andropogoneae—Ischaeminae)

Linnaeus: 1049 (1753); Stapf: 326 (1898); Chippindall: 486 (1955); Clayton & Renvoize: 746 (1982); Clayton & Renvoize: 345 (1986); Gibbs Russell *et al.*: 190 (1990); Watson & Dallwitz: 498 (1994).

Perennial, sometimes annual, rhizomatous. **Leaf blade** linear, expanded; *ligule* an unfringed membrane. **Inflorescence** of paired or digitate, spike-like racemes; internodes and pedicels often stout and clavate, usually exposed on back as U- or V-shaped segments; *spikelets* paired, secund, in long-short combinations: usually one sessile or subsessile, the other pedicelled, rarely both unequally pedicelled. **Sessile or subsessile spikelet** dorsiventrally compressed, falling with glumes; *glumes* ± equal, dissimilar; lower glume concave or somewhat convex on back, coriaceous to chartaceous, glabrous to hairy, markedly nerved upwards, usually 2-keeled, keels wingless to winged; upper glume boat-shaped, keeled at least above, awnless or awned or with a bristle, often rather broad. **Florets** 2; *lower floret* male or sterile, lemma membranous to hyaline, awnless; palea well developed; *upper floret* bisexual; *lemma* less firm than glumes, membranous to hyaline, 1–5-nerved, 2-lobed, awned from between lobes; *awn* geniculate, twisted, glabrous; *callus* inserted in concave top of internode; *palea* ± as long as lemma, hyaline. **Lodicules** 2, cuneate, fleshy, glabrous. **Stamens** 3. **Ovary** with stigmas linear-oblong, plumose. **Caryopsis** oblong to lanceolate, dorsiventrally compressed.

Pedicelled spikelet similar to sessile spikelet or ± reduced, dorsiventrally or laterally compressed, often asymmetrical, awned or awnless. $x = 10$ (high polyploidy).

Species ± 60, throughout the tropics, but mainly in Asia; 2 in sthn Afr., N Namibia, N Botswana, Northern Province, North-West, Gauteng, Mpumalanga, KwaZulu-Natal, and Eastern Cape.

Kaokochloa De Winter 9903611

(Chloridoideae—Pappophoreae)

De Winter: 479 (1961); Launert: 123 (1970a); Clayton & Renvoize: 190 (1986); Gibbs Russell *et al.*: 191 (1990); Watson & Dallwitz: 509 (1994).

Annual, tufted. **Leaf blade** linear-lanceolate; *ligule* a fringe of long hairs. **Inflorescence** a panicle, rather dense and contracted, branches single; rachis and branches grooved, densely villous, with a mixture of long, villous hairs and shorter, gland-tipped hairs; *spikelets* shortly pedicelled or subsessile, clustered on somewhat short branches. **Spikelet** not noticeably compressed, subglobose, disarticulating between glumes; *glumes* ± equal, ± equalling spikelet, subacute, 9–11-nerved, hairy, with long thin hairs mixed with shorter club-shaped, glandular hairs, awnless. **Florets** 3–6, bisexual, *uppermost floret* reduced, sterile, usually awnless; *lower lemma* coriaceous, becoming indurated, densely hairy in lower half between nerves, 9-nerved, apex incurved and emarginate, each margin is lobed, sometimes with 1 or 2 shorter additional lobes, 2–5-awned, lobes usually black in colour, marginal lobes with large, flat awns, median lobes with smaller awns; *awns* straight, hairy; *palea* elliptic, thinly coriaceous, shallowly concave dorsally, keels somewhat thickened, densely fimbriate with short stiff bristles, margin membranous, inflexed, long villous at base. **Lodicules** 2, somewhat fleshy, wedge-shaped, with a somewhat truncate apex. **Stamens** 3. **Ovary** glabrous, obovate-cuneate; styles 2, plumose. **Caryopsis** obovoid.

Species 1, sthn Afr.: *Kaokochloa nigrirostris* De Winter, NW Namibia.

Karroochloa Conert & Türpe 9902044

(Arundinoideae—Arundineae)

Conert & Türpe: 290 (1969) under *Danthonia* Stapf; Stapf: 516 (1899) under *Danthonia* Stapf; Chippindall: 241 (1955) under *Danthonia* Stapf; Conert: 175 (1965); Launert: 124 (1970a); Clayton & Renvoize: 175 (1986) under *Rytidosperma* Steud.; Gibbs Russell *et al.*: 192 (1990); Watson & Dallwitz: 510 (1994).

Danthonia Stapf: 516 (1899) in part.

Perennial or annual, tufted, sometimes stoloniferous or rhizomatous. **Leaf blade** narrow, expanded, flat or rolled; *ligule* a fringe of hairs. **Inflorescence** a dense, contracted panicle; *spikelets* solitary. **Spikelet** 4.0–7.0 mm long, laterally compressed, acute, disarticulating above glumes and between florets; *glumes* ± equal, as long as spikelet, membranous, margins and apices hyaline, glabrous, 3–5(7)-nerved, awnless. **Florets** 3–7; *lower florets* bisexual; *uppermost florets* reduced; *lemma* similar in texture to glumes, membranous, margins and apex hyaline, broadly elliptic or ovate; rounded on back, 9-nerved, scabrid, hairy, hairs in fringes, tufts or in rows, usually across middle of back or margins especially in lower half, 2-lobed, lobes awnless or awned; awn fine, straight; central *awn* from between lobes, awn as long as to longer than body of lemma, geniculate, twisted in lower part; *callus* short, blunt, hairy; *palea* membranous, margins narrowly hyaline, glabrous or shortly pilose, prominently 2-keeled, 2-nerved, nerves ciliate, lower part glabrous or pilose. **Lodicules** 2, cuneate. **Stamens** 3. **Ovary** obovoid, glabrous; styles 2, terminal, short, plumose. $x = 6$ (polyploidy).

Species 4, sthn Afr., mainly S Namibia, Free State, Lesotho, Northern, Western and Eastern Cape.

Koeleria Pers. 9903740

(Pooideae—Aveneae—Aveninae)

Persoon: 97 (1805); Stapf: 468 (1899); Stent: 301 (1924); Chippindall: 83 (1955); Clayton: 79 (1970); Launert: 69 (1971); Humphries: 218 (1980); Clayton & Renvoize: 127 (1986); Gibbs Russell *et al.*: 193 (1990); Watson & Dallwitz: 515 (1994).

Perennial, tufted, basal sheaths sometimes swollen into bulbs. **Leaf blade** expanded or almost filiform; *ligule* an unfringed membrane. **Inflorescence** a panicle, contracted, spike-like, dense and cylindrical, often interrupted; *spikelets* solitary, pedicelled. **Spikelet** 3.5–4.0 mm long, shining, laterally compressed, disarticulating above glumes; *glumes* ± equal to unequal, ± equal to longer than spikelet, lower sometimes shorter than spikelet, herbaceous, oblanceolate, linear or lanceolate-linear, acute, keeled, hairy or glabrous, with hyaline margins, sometimes mucronate; lower glume usually 1-nerved; upper glume 1–3-nerved. **Florets** 2–4, bisexual or *uppermost floret* reduced and sterile; *lemma* 3–5 mm long, longer than glumes, similar in texture to glumes, 3-nerved, keeled, acute to acuminate, entire, sometimes with a mucro or awned (usually minute); *palea* projecting and conspicuous in mature spikelet, linear or narrowly lanceolate, subacute, 2-keeled, 2-toothed, thinner in texture than lemma, hyaline. **Lodicules** 2, hyaline, glabrous. **Stamen** 3. **Ovary** glabrous; styles distinct, plumose. $x = 7$ (aneuploids, high polyploidy).

Species 35–60, temperate regions throughout the world, montane regions of tropical and subtropical Africa; 1 in sthn Afr.: *Koeleria capensis* (Steud.) Nees, mainly high eastern regions, not in Namibia and Botswana.

*__Lagurus__ L. 9902610

(Pooideae—Aveneae—Alopecurinae)

Linnaeus: 81 (1753); Chippindall: 96 (1955); Clayton & Renvoize: 138 (1986); Gibbs Russell *et al.*: 194 (1990); Watson & Dallwitz: 516 (1994).

Annual, tufted, softly and densely hairy. **Leaf blade** expanded, linear to narrowly lanceolate, velvety; sheaths softly pilose; *ligule* an unfringed or rarely a fringed membrane. **Inflorescence** a solitary, dense, globose to ovoid or oblong-cylindrical, spike-like panicle, softly hairy and long bristly; *spikelets* subsessile or pedicelled. **Spikelet** laterally compressed, disarticulating above glumes, rachilla extension present; *glumes* ± equal, similar, thinly membranous, narrowly lanceolate, with long silky hairs, 1-nerved, long-acuminate, awned; awn fine, longer than glumes. **Floret** 1, bisexual; *lemma* membranous, shorter than glumes, lanceolate, rounded on back, hairy near base, 5-nerved, 2-lobed, 3-awned, each lobe awned with a fine straight *awn*; central awn longer than lemma, slightly geniculate, twisted; *palea* somewhat shorter than lemma, ovate, acuminate, 2-keeled. **Lodicules** 2, hyaline. **Stamens** 3. **Ovary** ellipsoid, glabrous; styles plumose. **Caryopsis** narrowly ellipsoid. $x = 7$.

Species 1, Mediterranean region: **Lagurus ovatus* L., naturalised in sthn Afr., mainly Western and Eastern Cape, rarely Gauteng.

*__Lamarckia__ Moench 9903720

(Pooideae—Poeae)

Moench: 201 (1794); Stapf: 688 (1900); Chippindall: 61 (1955); Tutin: 172 (1980); Clayton & Renvoize: 99 (1986); Gibbs Russell *et al.*: 195 (1990); Watson & Dallwitz: 517 (1994).

Annual, tufted, sometimes geniculate. **Leaf blade** expanded; *ligule* a hyaline, unfringed membrane. **Inflorescence** a usually 1-sided panicle, contracted, spike-like, soft and silky; spikelets in clusters of 4 or 5; terminal spikelet bisexual; other spikelets sterile, either male or empty lemmas; smaller fertile spikelet ± covered by others; *spikelets* pedicelled, pedicels hairy, deciduous in clusters. **Bisexual spikelet** laterally compressed, cuneate; *glumes* ± equal, as long as to longer than spikelet, membranous, keeled, 1-nerved, acuminate or shortly awned. **Florets** 1 or 2; *lowest floret* bisexual; *upper floret* reduced; *lemma* lanceolate, or ovate-oblong, membranous, 4- to 5-nerved, 2-lobed, awned from sinus; *awn* delicate, more than twice as long as lemma, straight; *palea* same texture as lemma, lanceolate, subacuminate, 2-lobed, 2-keeled. **Lodicules** 2, minute, glabrous. **Stamens** 3; styles distinct, barbellate. **Caryopsis** ellipsoid.

Sterile spikelet linear; florets up to 15, sterile; glumes lanceolate, acute; lemma obovate, membranous, keeled, obtuse, awnless. $x = 7$.

Species 1: **Lamarckia aurea* (L.) Moench, Mediterranean to Pakistan; introduced into sthn Afr., recorded from Western Cape.

Leersia Sw. 9901590

(Bambusoideae—Oryzeae)

Swartz: 21 (1788); Stapf: 659 (1900); Chippindall: 33 (1955); Launert: 125 (1970a); Clayton: 24 (1970); Launert: 26 (1971); Clayton & Renvoize: 73 (1986); Gibbs Russell *et al.*: 196 (1990); Watson & Dallwitz: 526 (1994).

Perennial, rarely annual; tufted, often with creeping rhizomes or stoloniferous; culm slender, often geniculate and ascending. **Leaf blade** narrow, expanded, folded or rolled; *ligule* an unfringed membrane. **Inflorescence** a panicle, open or contracted; *spikelets* solitary, secund, shortly pedicelled. **Spikelet** unconventional and hard to interpret, strongly laterally compressed; *glumes* 0 or reduced to a very obscure rim at tip of pedicel. **Floret** 1; *lemma* coriaceous, not becoming indurated, boat-shaped, almost plano-convex in outline, keels rigidly ciliate, 3–5-nerved, shortly acuminate or awned; *palea* narrow, 3-nerved, subcartilaginous except on hyaline margins, grooved along outer nerves with keel rigidly ciliate, tightly clasped by inflexed margins of lemma. **Lodicules** 2, fleshy, finely nerved. **Stamens** (1–)6. **Ovary** ellipsoid, glabrous; styles distinct, plumose. $x = 12$ (polyploidy).

Species 18, throughout tropics and warm temperate regions; 4 in sthn Afr., widespread in moist habitats.

Leptocarydion Stapf 9903430

(Chloridoideae—Eragrostideae—Eleusininae)

Stapf: 316 (1898); Chippindall: 127 (1955); Phillips: 294 (1974); Clayton & Renvoize: 213 (1986); Gibbs Russell *et al.*: 197 (1990); Watson & Dallwitz: 530 (1994).

Annual, tufted. **Leaf blade** lanceolate to ovate, broad, rounded or abruptly constricted at base, expanded or rolled; *ligule* a fringed membrane. **Inflorescence** ± oblong, dense, silky, spike-like, composed of many, crowded, slender, 1-sided racemes appressed to axis; *spikelets* solitary, sessile or subsessile. **Spikelet** laterally compressed, disarticulating above glumes and between florets; *glumes* very unequal, shorter than spikelet, linear, keeled, 1-nerved, acuminate to acute, sometimes mucronate. **Florets** 5–14; *lower florets* bisexual; *upper floret* reduced and sterile; *lemmas* similar, elliptic-lanceolate, keeled, 3-nerved, nerves conspicuously hairy, truncate or minutely 2–4-lobed, midnerve excurrent into a long slender, straight, scabrid *awn*; *callus* hairy; *palea* linear-lanceolate, shorter than lemma, 2-keeled, hyaline. **Lodicules** 2, cuneate, glabrous. **Stamens** 3; anthers minute. **Ovary** glabrous; styles distinct, slender, plumose. **Caryopsis** linear.

Species 1, eastern and sthn Afr.: *Leptocarydion vulpiastrum* (De Not.) Stapf, N Namibia and Botswana, Northern Province, Mpumalanga and KwaZulu-Natal.

Leptochloa P.Beauv. 9903330

(Chloridoideae—Eragrostideae—Eleusininae)

Palisot de Beauvois: 71 (1812); Chippindall: 121 (1955); Pilger: 41 (1956); Phillips: 276 (1974); Phillips: 142 (1982); Clayton & Renvoize: 209 (1986); Gibbs Russell *et al.*: 198 (1990); Watson & Dallwitz: 531 (1994); Cope: 23 (1999).

Diplachne P.Beauv.: 80 (1812); Stapf: 590 (1900); Stent: 296 (1924); Chippindall: 118 (1955); Launert: 67 (1970a); Phillips: 281 (1974); Phillips: 142 (1982); Gibbs Russell *et al.*: 116 (1990); Watson & Dallwitz: 338 (1994).

Annual or perennial, tufted, stoloniferous, rhizomatous, often geniculate. **Leaf blade** lanceolate to linear, expanded or rolled; *ligule* an unfringed or fringed membrane, rarely a fringe of hairs. **Inflorescence** a contracted or open panicle of several, slender, 1-sided, spike-like racemes scattered along a central axis; *spikelets* solitary, subsessile or shortly pedicelled. **Spikelet** 1.9–14.0 mm long, laterally or dorsiventrally to not noticeably compressed, disarticulating above glumes and between florets; *glumes* unequal to ± equal, shorter to rarely longer than spikelet, similar, membranous, lanceolate to ovate, sometimes subacuminate or notched, 1-nerved, keeled to rounded on back, mucronate to awnless. **Florets** 1–20, bisexual; *uppermost floret* sterile or reduced, often decreasing in size upwards; *lemma* lanceolate or oblong-elliptic to elliptic, keeled to rounded or flattened on back, less firm to similar in texture as glumes, 3-nerved, glabrous or minutely hairy along nerves and/or back or margins, single median keel present on back to not keeled, obtuse or acute to ± truncate or 2-lobed, awnless, mucronate or awned between lobes; *awn* shorter than body of lemma to minute, sometimes lateral nerves excurrent into short mucros; *callus* short, blunt; *palea* almost as long as lemma, sometimes 2-lobed, 2-keeled, flat dorsally or concave between keels, glabrous to minutely or distinctly hairy, subhyaline. **Lodicules** 2, cuneate, fleshy, glabrous. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose. **Caryopsis** ellipsoid to ellipsoid-oblong, laterally to dorsally compressed. $x = 10$ (polyploidy).

Species ± 30, tropical and subtropical regions: 7 in sthn Afr., widespread.

Lepturus R.Br. 9904420

(Chloridoideae—Leptureae)

Brown: 207 (1810); Stapf: 740 (1900); Pilger: 73 (1956); Hubbard: 388 (1974); Clayton & Renvoize: 229 (1986); Gibbs Russell *et al.*: 199 (1990); Watson & Dallwitz: 542 (1994).

Perennial, tufted, stoloniferous. **Leaf blade** expanded or rolled, linear, usually mainly cauline; *ligule* a fringed membrane. **Inflorescence** a single cylindrical spike with spikelets sunken and closely adpressed in depressions on alternate sides of main axis, axis disarticulating at joints; *spikelets* solitary, sessile. **Spikelet** 8–22 mm long, dorsiventrally compressed, falling with glumes; *glumes* very dissimilar, unequal; lower glume minute or 0; upper glume coriaceous, longer than spikelet and covering lemma, facing outwards, lanceolate, 5–12-nerved, awned; glumes of terminal spikelet both well developed, equal, similar. **Floret** 1, rarely 2, bisexual; *upper floret* reduced and sterile occasionally fertile; *lemma* less firm than glumes, membranous, lanceolate, obtuse to acute, rounded on back, 3-nerved, awnless; *palea* as long as lemma, lanceolate, 2-nerved, hyaline. **Lodicules** 2, obovate to elliptic. **Stamens** 3. **Ovary** truncate, glabrous; styles distinct, plumose. **Caryopsis** ellipsoid. $x = 7$ (9, 13) (polyploidy).

Species ± 15, E Africa, Sri Lanka, Polynesia to Australia; 1 in sthn Afr.: *Lepturus repens* (G.Forst.) R.Br., KwaZulu-Natal (Ingwavuma District).

Leucophrys Rendle 9901030

(Panicoideae—Paniceae—Setariinae)

Rendle: 193 (1899); Pilger: 254 (1954); Chippindall: 379 (1955); Launert: 126 (1970a); Clayton & Renvoize: 283 (1986) under *Brachiaria* Griseb.; Gibbs Russell *et al.*: 200 (1990); Watson & Dallwitz: 544 (1994).

Perennial; culms woody, stiffly geniculate, branched profusely from swollen nodes. **Leaf blade** linear, expanded or rolled, often spiny, hard and brittle; leaf sheath broad and papery; *ligule* a fringe of hairs. **Inflorescence** a contracted but loose panicle, branches slender, each with 2–6 spikelets; *spikelets* solitary or paired, pedicels unequal, hairy, contracted at base into a short stalk which fits into cup-like apex of pedicel. **Spikelet** 7 mm long, dorsiventrally compressed, falling with glumes; *glumes* ± equal to unequal, ± equal to longer than spikelet, dissimilar; lower glume membranous, lanceolate, obtuse or notched at apex, hairy at base, 3-nerved; upper glume ovate-lanceolate, tapering into a long awn-like apex, 5–7-nerved, long-hairy dorsally, with a transverse fringe or tufts of hairs on either side just above middle, or a continuous fringe. **Florets** 2; *lower floret* male, lemma equalling upper glume, channelled dorsally, hairy, hairs always in 2 fringes; palea well developed; *upper floret* bisexual; *lemma* ± half as long as lower lemma, elliptic, obtuse, indurated, smooth, glossy, glabrous, faintly 5-nerved, awnless; *palea* relatively long. **Lodicules** 2, cuneate, fleshy. **Stamens** 3. **Ovary** ellipsoid; styles free, plumose. $x = 9$ (1 report).

Species 1, Angola and sthn Afr.: *Leucophrys mesocoma* (Nees) Rendle; sthn Afr. in S Namibia to Northern Cape.

Lintonia Stapf 9902020

(Chloridoideae—Cynodonteae—Pommereullinae)

Stapf: t. 2949 (1911); Chippindall: 117 (1955); Phillips: 302 (1974); Clayton & Renvoize: 235 (1986); Gibbs Russell *et al.*: 201 (1990); Watson & Dallwitz: 553 (1994).

Perennial, tufted, stoloniferous. **Leaf blade** narrow-linear, expanded, tapering to a fine acuminate point; *ligule* an unfringed membrane, truncate. **Inflorescence** of 1–5 spike-like racemes, digitate or subdigitate; *spikelets* solitary, shortly pedicelled. **Spikelet** 6–10 mm long, plump, wedge-shaped, laterally compressed, disarticulating above glumes but not between florets; *glumes* unequal, shorter than spikelet, membranous, 1-nerved, weakly keeled, awnless, dissimilar; lower glume shorter than upper glume, lanceolate, obtuse; upper glume oblong, notched at apex. **Florets** 4–10, lower 2–4 bisexual, *upper* or *uppermost floret* reduced and sterile; *lemmas* firmer than glumes, similar, broad, obovate, rounded on back, 5–9-nerved, nerves slightly shorter than lemma, shortly 2-lobed, hairy, hairs short, stiff, sharp-pointed to obtuse or club-shaped, in rows on lower half or towards base of lobes, shortly awned from between lobes or from back near apex; *awn* straight to curved, not geniculate; *callus* hairy; *palea* elliptic-lanceolate, shortly 2-lobed, flat dorsally, 2-keeled, ciliate on keels. **Lodicules** 2, oblong. **Stamens** 3. **Ovary** shortly stalked, oblong; styles fused at base, plumose. **Caryopsis** dorsiventrally flattened, enclosed within a free hyaline pericarp. $x = 15$ (1 report).

Species 2, Africa; 1 in sthn Afr.: *Lintonia nutans* Stapf, Botswana, northern provinces of South Africa, Mpumalanga and Swaziland.

*Lolium L. 9904330

(Pooideae—Poeae)

Linnaeus: 83 (1753); Stapf: 738 (1900); Stent: 303 (1924); Chippindall: 58 (1955); Launert: 42 (1971); Hubbard: 41 (1970); Humphries: 153 (1980); Clayton & Renvoize: 95 (1986); Gibbs Russell *et al.*: 201 (1990); Watson & Dallwitz: 558 (1994).

Annual or perennial (usually short-lived), tufted or culms solitary, sometimes rooting from nodes. **Leaf blade** linear, expanded, rolled or folded; *ligule* an unfringed membrane. **Inflorescence** a bilateral spike with spikelets sunk and lying edgeways in partial cavities on alternate sides of central axis; *spikelets* solitary, sessile. **Spikelet** laterally compressed, disarticulating above glumes; *glumes* unequal; lower glume absent except in terminal spikelet, rarely present and then much reduced; upper glume facing outwards, membranous, shorter than to as long as spikelet, lanceolate or linear-lanceolate, sometimes turgid in fruit, obtuse or subacute, 3–7-nerved, glabrous. **Florets** 2–22, bisexual or *uppermost floret* reduced and sterile; *lemma* less firm to firmer in texture to glumes, coriaceous, lanceolate or elliptic, rounded dorsally, 5–7-nerved, glabrous, acute to obtuse or awned; *awn* straight; *palea* equalling or subequalling body of lemma, somewhat thinner in texture, lanceolate, lanceolate-elliptic or lanceolate-oblong, 2-keeled. **Lodicules** 2, lanceolate with a lateral tooth. **Stamens** 3. **Ovary** truncate, glabrous; styles distinct, plumose. $x = 7$ (polyploidy).

Species 8, temperate regions of Eurasia, introduced elsewhere; ± 4 naturalised in sthn Afr., widespread.

Lophacme Stapf 9903520

(Chloridoideae—Eragrostideae—Eleusininae)

Stapf: 316 (1898); Stapf: 647 (1900); Stent: 292 (1924); Chippindall: 127 (1955); Pilger: 32 (1956); Clayton & Renvoize: 213 (1986); Gibbs Russell *et al.*: 203 (1990); Watson & Dallwitz: 560 (1994).

Perennial, tufted, rhizomatous, basal sheaths fibrous. **Leaf blade** expanded or rolled, almost setaceous; *ligule* a fringed membrane. **Inflorescence** 2–8 slender, spike-like racemes, digitate or subdigitate; *spikelets* solitary, subsessile or shortly pedicelled, somewhat distant on rachis. **Spikelet** laterally compressed, disarticulating above glumes and between florets; *glumes* ± equal or unequal, shorter to as long as spikelet, linear, similar, membranous, glabrous, 1-nerved, keeled, awnless. **Florets** 2–many, dissimilar; *lower florets* 1–3 bisexual or *second floret* sometimes male only; *upper florets* 1–5 sterile, reduced to awns, forming a tuft which remains attached to upper fertile floret; bisexual *lemma* linear, less firm than glumes, thinly membranous, finely hairy, 3-nerved, dorsally keeled, shortly 2-lobed, central awn from between lobes; *awn* slender, straight, longer than body of lemma; *callus* short, pointed, minutely hairy; *palea* slightly shorter than lemma, linear, acute, deeply concave on back, 2-keeled, subhyaline. **Lodicules** 2, minute, hyaline, glabrous. **Stamens** 3. **Ovary** glabrous; styles distinct, short, loosely plumose above. **Caryopsis** fusiform.

Species 2, south tropical and sthn Afr.; 1 in sthn Afr.: *Lophacme digitata* Stapf, northern provinces of South Africa to KwaZulu-Natal.

*Lophochloa Rchb. 9903741

(Pooideae—Aveneae—Aveninae)

Reichenbach: 42 (1830); Chippindall: 84 (1955) under *Trisetaria* Forssk.; Jonsell: 220 (1980); Clayton & Renvoize: 128 (1986) included under *Rostraria* Trin.; Gibbs Russell *et al.*: 204 (1990); Watson & Dallwitz: 515 (1994) under *Koeleria* Pers.

Annual, tufted. **Leaf blade** linear, expanded; *ligule* an unfringed membrane. **Inflorescence** a spike-like panicle. **Spikelet** 2.5–5.0 mm long, laterally compressed, variously disarticulating; *glumes* unequal or ± equal, shorter to ± equal to longer than spikelet, similar, glabrous or hairy, keeled, sometimes hairy on keel, awnless; lower glume 1-nerved; upper glume 3-nerved. **Floret** 2–6, all bisexual or uppermost reduced; *lemma* 3–7-nerved, 2-lobed, keeled, usually conspicuously 1–3-awned; *awn* short, straight; *palea* 2-lobed, 2-keeled. **Lodicules** 2, membranous. **Stamens** 3. **Ovary** usually glabrous. $x = 6$, 7, 13.

Species ± 85, temperate regions of the world; 2 naturalised in sthn Afr., western regions of Northern Cape, Western and Eastern Cape.

Loudetia Hochst. ex Steud. 9901751

(Panicoideae—Arundinelleae)

Steudel: 238 (1854); Stapf: 452 (1899); Stent: 287 (1924); Chippindall: 279 (1955); Conert: 247 (1957); Phipps: 87 (1964); Clayton: 122 (1967b); Launert: 126 (1970a); Clayton: 415 (1974); Clayton & Renvoize: 319 (1986); Clayton: 216 (1989); Gibbs Russell *et al.*: 205 (1990); Watson & Dallwitz: 567 (1994).

Perennial, tufted. **Leaf blade** narrowly linear to linear, expanded or rolled; *ligule* a fringe of hairs. **Inflorescence** an open or contracted, rarely spike-like panicle; *spikelets* solitary or in pairs, rarely in threes, pedicelled, pedicels free, stout, often of unequal lengths, usually longest pedicel ± twice as long as shortest pedicel. **Spikelet** 6–28 mm long, usually brown, laterally to not noticeably compressed, disarticulating above glumes; *glumes* very unequal, chartaceous to coriaceous, 3-nerved, glabrous or coarsely hairy, hairs with black or brown tubercles, awnless or shortly awned; lower glume usually ovate or ovate-elliptic, acuminate, acute, obtuse or truncate, rarely setaceously acuminate, up to half as long as upper; upper glume linear-lanceolate or lanceolate, obtuse or truncate, less often acute and rarely setaceously acuminate, as long as or nearly as long as spikelet. **Florets** 2, *lower floret* male or rarely sterile; lemma 3–5-nerved; *upper floret* bisexual; *lemma* similar to firmer in texture than glumes, thinly coriaceous, linear to linear-lanceolate, rounded on back, 5–9-nerved, glabrous to hairy, hairs not in tufts, shortly or deeply 2-lobed, lobes obtuse or acute, awned from between 2 lobes or from apex; *awn* geniculate, strongly twisted below, up to 4 times as long as spikelet; *callus* short to long, oblong to linear, truncate, 2-toothed or obliquely pungent, hairy; *palea* linear to linear-lanceolate, shorter or up to as long as lemma, 2-keeled, keels with thickened nerves, wingless, membranous. **Lodicules** 2, linear or narrowly cuneate. **Stamens** 2 or 3. **Ovary** glabrous; styles free, plumose. **Caryopsis** narrowly ovoid. $x = 6$, 12 (polyploidy).

Species ± 26, mostly tropical Africa, also Madagascar and South America; 6 in sthn Afr., N Namibia, Botswana, northern provinces of South Africa, Swaziland and KwaZulu-Natal.

Megaloprotachne C.E.Hubb. 9900881

(Panicoideae—Paniceae—Digitariinae)

Hubbard: 319 (1929); Chippindall: 422 (1955); Clayton & Renvoize: 298 (1986); Clayton: 130 (1989); Gibbs Russell *et al.*: 207 (1990); Watson & Dallwitz: 583 (1994).

Annual, tufted or decumbent, sometimes rooting at lower nodes. **Leaf blade** linear, expanded or folded; *ligule* a fringed membrane. **Inflorescence** of 3–9 spike-like, one-sided racemes, solitary or paired on a central axis shorter than racemes, digitate to subdigitate; *spikelets* similar, unequally pedicelled, pedicel linear, saucer-shaped at apex. **Spikelet** dorsiventrally compressed; *glumes* usually unequal, sometimes ± equal, dissimilar, awnless; lower glume as long as to slightly longer than spikelet, lanceolate, somewhat convex dorsally, obtuse, margins inturned, 5–7-nerved, glabrous;

upper glume lanceolate, 3-nerved, densely hairy with four rows of long, green or purple hairs between nerves near margins. **Florets** 2; *lower floret* male; lemma elliptic, 3–5-nerved, pilose on margins, a few hairs tubercle-based; palea fully developed, elliptic to elliptic-lanceolate, flat dorsally, 2-keeled, margins inturned; *upper floret* bisexual, *lemma* much firmer than glumes, hard and glossy except for thin translucent margins, glabrous, ovate-elliptic, shortly subacuminate, convex dorsally, margins flat covering most of palea (Digitaria-type), awnless; *palea* same as lower floret. **Lodicules** 2, cuneate, fleshy to hyaline. **Stamens** 3. **Ovary** ellipsoid; styles free, plumose.

Species 1, sthn Afr.: *Megaloprotachne albescens* C.E.Hubb., Namibia, Botswana and Northern Cape.

Megastachya P.Beauv. 9903881

(Centothecoideae—Centotheceae)

Palisot de Beauvois: 74 (1812); Phillips: 139 (1951); Chippindall: 45 (1955); Clayton: 161 (1970); Launert: 139 (1971); Clayton & Renvoize: 160 (1986); Gibbs Russell *et al.*: 208 (1990); Watson & Dallwitz: 585 (1994).

Annual or short-lived perennial, tufted. **Leaf blade** expanded, broadly lanceolate, cross veins present (more visible on lower surface), amplexicaul at base; *ligule* an unfringed membrane. **Inflorescence** an open panicle; *spikelets* solitary, pedicels long, slender. **Spikelet** laterally compressed, disarticulating above glumes and between florets; *glumes* unequal, similar, shorter than spikelet, keeled, obtuse to broadly ovate, 3- or 4-nerved, middle nerve excurrent into a short awn or mucro. **Florets** many, all bisexual though smaller at apex; *lemma* similar in texture to glumes, chartaceous, glabrous, obscurely 5–7-nerved, apex shortly 2-lobed or emarginate, middle nerve running out into a short mucro between lobes; *palea* almost equalling lemma, 2-keeled, ciliolate on keels, membranous, inflexed margins very narrow. **Stamens** 2 or 3. **Ovary** glabrous; styles distinct, plumose. **Caryopsis** subglobose. $x = 12$ (polyploidy).

Species 1, tropical and sthn Afr.: *Megastachya mucronata* (Poir.) P.Beauv., N KwaZulu-Natal.

Melica L. 9903860

(Pooideae—Meliceae)

Linnaeus: 66 (1753); Stapf: 684 (1900); Chippindall: 73 (1955); Gibbs Russell & Ellis: 37 (1982); Clayton & Renvoize: 113 (1986); Gibbs Russell *et al.*: 209 (1990); Watson & Dallwitz: 587 (1994).

Perennial, tufted. **Leaf blade** expanded or rolled, frequently slightly auricled; *ligule* a delicate, hyaline, unfringed membrane. **Inflorescence** an erect terminal raceme or a narrow panicle, often secund; *spikelets* solitary, on short pedicels with thickened tips; pedicels capillary and often nodding. **Spikelet** 5–15 mm long, weakly laterally compressed, variously disarticulating; *glumes* ± equal or unequal, ± equal to spikelet, papery, similar, lanceolate or ovate-lanceolate, subacuminate, acute or subacute; upper glume 3–7-nerved. **Florets** 3–6; *lower* 2 *florets* (rarely 1 or 3) bisexual; *upper* 2 or 3 *florets* sterile, reduced to lemmas compacted to form a club-shaped body on prolonged rachis, glabrous or hairy; *bisexual floret*: *lemma* lanceolate, membranous, 7–9-nerved, rounded on back, hairy with long, silky, silvery hairs on back or only near margins, awnless; *callus* short, glabrous; *palea* shorter than lemma, lanceolate or oblanceolate, acute, 2-keeled, ciliate on keels. **Lodicules** 2, short, thick, rounded, glabrous. **Stamens** 3. **Ovary** glabrous; styles distinct, short, finely plumose. $x = 9$ (7) (polyploidy).

Species ± 80, temperate regions throughout the world except Australia; 2 in sthn Afr., widespread, not recorded from Namibia and Botswana.

Melinis P.Beauv. 9901340

(Panicoideae—Paniceae—Melinidinae)

Palisot de Beauvois: 54 (1812); Stapf: 447 (1899); Stent: 257 (1924); Chippindall: 426 (1955); Clayton & Renvoize: 505 (1982); Clayton & Renvoize: 295 (1986); Zizka: 50 (1988); Zizka: 115 (1989); Gibbs Russell *et al.*: 210 (1990); Watson & Dallwitz: 589 (1994).

Rhynchelytrum Nees: 446 (1936); Chippindall: 428 (1955); Clayton & Renvoize: 295 (1986); Watson & Dallwitz: 822 (1994).

Annual or perennial, tufted. **Leaf blade** expanded, rarely rolled, usually linear-lanceolate, blades and sheaths pilose with bulbous-based hairs or glabrous; *ligule* a fringed membrane or a fringe of hairs. **Inflorescence** a panicle, contracted and narrow or open and spreading; *spikelets* pedicelled, pedicels capillary. **Spikelet** symmetrical or asymmetrical in profile; laterally or dorsiventrally compressed or not noticeably compressed, glabrous to densely hairy; *glumes* unequal, dissimilar, awnless or awned; lower glume reduced to a minute scale or rim or absent, sometimes distant from upper glume, nerveless to 1-nerved; upper glume as long as spikelet, sometimes gibbous, emarginated to 2-lobed at apex, often awned from between lobes, sometimes tapering to a beak above, finely or prominently 5–9-nerved. **Florets** 2; *lower floret* male or sterile; lemma resembling upper glume but narrower, often hairy, 3–7-nerved, awnless or usually awned; palea present or 0, when present scaberulous or ciliate on margins; *upper floret* bisexual; *lemma* less firm to similar in texture as glumes, smaller than lower lemma, often deciduous before rest of spikelet, smooth, glabrous, margins flat and ± covering palea; *palea* similar to upper lemma. **Lodicules** 3, very delicate. **Stamens** 3. **Ovary** ellipsoid, glabrous; style free, plumose. **Caryopsis** oblong to oblong-ellipsoid. $x = 9$ (polyploidy).

Species 20, mainly Africa, also on other continents but possibly introduced there; 10 in sthn Afr., widespread.

Merxmuellera Conert 9902043

(Arundinoideae—Arundineae)

Conert: 129 (1970); Stapf: 516 (1899) under *Danthonia* DC.; Phillips: 120 (1951) under *Danthonia* DC.; Chippindall: 241 (1955) under *Danthonia* DC.; Conert: 299 (1971); Clayton & Renvoize: 175 (1986) under *Rytidosperma* Steud.; Gibbs Russell *et al.*: 213 (1990); Watson & Dallwitz: 593 (1994); Benesch: 11 (1995).

Danthonia DC., in part, Stapf: 516 (1899).

Perennial, tufted, sometimes reed-like. **Leaf blade** linear, usually rolled; basal sheaths, hard, shining, glabrous and smooth, rarely hairy; sheath-mouth often bearded; *ligule* a short fringe of hairs. **Inflorescence** a panicle, narrow, usually contracted, rarely a spike-like raceme; *spikelets* pedicelled. **Spikelet** 8–25 mm long, laterally compressed; disarticulating above glumes and between florets; *glumes* ± equal or lower glume somewhat shorter, ± as long as to longer than spikelet, similar, chartaceous, margins and apex hyaline, 1-keeled to middle or below, 1–5-nerved, median nerve prominent, lateral nerves usually only prominent in lowermost part, awnless. **Florets** 3–10 rarely 2; *lower florets* bisexual; *uppermost floret* rudimentary and sterile; *lemma* 5–16 mm long, rounded on back, similar in texture to glumes, 7–9-nerved, hairy, hairs usually arranged in tufts and fringes, rarely dispersed all over or glabrous, 2-lobed, lobes usually free, usually finely awned, often partly adnate to rarely completely adnate to central awn, central awn from sinus; *awn* usually geniculate and column twisted, rarely awn straight; *callus* rounded, hairy; *palea* bidentate, awnless, almost equal to lemma, 2-keeled, lanceolate, similar in texture to lemma, hyaline, glabrous between keels, rarely densely hairy, nerves ciliate or shortly pilose. **Lodicules** 2, long, membranous, often

ciliate. **Stamens** 3. **Ovary** ovoid, glabrous; styles 2, long and plumose. $x = 6$.

Species ± 17, sthn Afr., 1 in Namibia: *Merxmuellera rangei* (Pilg.) Conert, remainder mainly in mountainous areas of Northern Province, Mpumalanga, Free State, KwaZulu-Natal, Lesotho, southern regions of the Northern, Western and Eastern Cape.

Microchloa R.Br. 9902940

(Chloridoideae—Cynodonteae—Chloridinae)

Brown: 208 (1810); Stapf: 635 (1900); Stent: 287 (1924); Chippindall: 203 (1955); Launert: 129 (1970a); Renvoize: 313 (1974); Clayton & Renvoize: 242 (1986); Gibbs Russell *et al.*: 218 (1990); Watson & Dallwitz: 601 (1994).

Perennial, rarely annual, tufted or mat-forming. **Leaf blade** longitudinally folded and setaceous, rarely expanded; *ligule* a narrow fringed membrane or a fringe of hairs. **Inflorescence** a solitary, terminal, slender, curved, 1-sided spike; rachis semicrescent in section, hairy; *spikelets* solitary, sessile. **Spikelet** dark, dorsiventrally to not noticeably compressed, disarticulating above glumes; *glumes* ± equal, ± as long as spikelet or lower glume little shorter than spikelet, dissimilar, membranous, 1-nerved, awnless; lower glume lanceolate or linear-oblong, acute or obtuse, keeled, somewhat gibbous at base; upper glume lanceolate, acute, rounded on back. **Floret** 1, bisexual; *lemma* lanceolate or ovate, membranous to hyaline, 2-nerved, densely hairy on margins and midrib, awnless or mucronate; *palea* almost equalling or slightly shorter than lemma, hyaline, pilose. **Lodicules** 2, cuneate, glabrous, thin, faintly nerved. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose. **Caryopsis** ellipsoid. $x = 10$ (polyploidy).

Species ± 4, throughout tropics; 3 in sthn Afr., widespread, not recorded in Western Cape.

*__Microlaena__ R.Br. 9901610

(Bambusoideae—Ehrharteae)

Brown: 210 (1810); Willemse: 181 (1982); Clayton & Renvoize: 76 (1986) included in *Ehrharta* Thunb.; Gibbs Russell *et al.*: 219 (1990); Watson & Dallwitz: 603 (1994).

Perennial, weakly tufted, sometimes rhizomatous. **Leaf blade** linear to lanceolate, usually flat; *ligule* a fringed to unfringed membrane. **Inflorescence** a single raceme or open panicle; *spikelets* pedicelled. **Spikelet** laterally compressed, disarticulating above glumes; *glumes* unequal, similar, reduced to minute lips, membranous, awnless, separated from florets by stipe. **Florets** 3, *lower* 2 *florets* sterile, reduced to lemmas; lemma long-acuminate, tapering into a long slender awn, keeled, 5–7-nerved; palea 0; *upper floret* bisexual, *lemma* firmer in texture than glumes, 5–7-nerved, mucronate, awned or awnless; *awn* straight, shorter than body of lemma; *callus* hairy; *palea* usually present, membranous. **Lodicules** 2, membranous, glabrous. **Stamens** 2–6. **Ovary** glabrous. **Caryopsis** ellipsoid. $x = 10$.

Species ± 10, Philippines, Java to Australia; 1 naturalised in sthn Afr.: **Microlaena stipoides* (Labill.) R.Br., KwaZulu-Natal.

Microstegium Nees 9900550

(Panicoideae—Andropogoneae—Saccharinae)

Nees ab Esenbeck: 447 (1836); Stapf: 326 (1898) under *Pollinia* Trin.; Chippindall: 484 (1955); Clayton & Renvoize: 715 (1982); Clayton & Renvoize: 335 (1986); Gibbs Russell *et al.*: 220 (1990); Watson & Dallwitz: 605 (1994).

Annual, sometimes perennial, delicate, mostly rambling or creeping, rooting at lower nodes. **Leaf blade** linear to lanceolate, narrowed at base, often with a false petiole, expanded; *ligule* an unfringed membrane. **Inflorescence** terminal, open, of slender, spike-like, digitate to subdigitate racemes, spikelets loosely spaced; internodes and pedicels linear, rarely inflated; *spikelets* usually similar, in pairs, one sessile, the other pedicelled, pedicels free of rachis. **Sessile spikelet** dorsiventrally compressed, falling with glumes, linear-lanceolate, bearded at base with a ring of white hairs; *glumes* ± equal, dissimilar; lower glume narrow, acute or notched at tip, shallowly concave on back to medianly grooved, margins sharply inflexed; upper glume weakly keeled or rounded on back, acute. **Florets** 2; *lower floret* male or sterile, reduced to a linear-lanceolate, hyaline, nerveless scale or suppressed (often mixed on same inflorescence), awnless; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, linear to cordate, often minute, narrow, 1-nerved, minutely 2-lobed, awned from between lobes; *awn* hair-like, flexuous, glabrous; *callus* obtuse, hairy; *palea* much reduced or 0. **Lodicules** 2, cuneate. **Stamens** 2 or 3. **Ovary** oblong-elliptic, glabrous. **Caryopsis** ellipsoid to lanceolate, dorsally flattened.

Pedicelled spikelet similar to sessile spikelet. $x = 10$ (polyploidy).

Species ± 15, tropical Asia and Africa but possibly introduced there; 1 in sthn Afr.: *Microstegium nudum* (Trin.) A.Camus, northern provinces of South Africa, KwaZulu-Natal and Western Cape.

Miscanthus Andersson 9900380

(Panicoideae—Andropogoneae—Saccharinae)

Andersson: 165 (1856); Clayton & Renvoize: 702 (1982); Clayton & Renvoize: 332 (1986); Gibbs Russell *et al.*: 221 (1990).

Miscanthidium Stapf: 89 (1917); Chippindall: 477 (1955); Watson & Dallwitz: 609 (1994).

Perennial, tufted, often robust, sometimes rhizomatous. **Leaf blade** linear, expanded or whole blade terete; *ligule* an unfringed to a fringed membrane. **Inflorescence** a panicle, open or contracted, often large and plumose; rachis tough, internodes and pedicels slender and free; *spikelets* paired, unequally pedicelled, similar in form and function. **Spikelet** dorsiventrally compressed, falling with glumes, narrowly oblong to lanceolate, surrounded by an involucre of spreading hairs from callus; *glumes* ± equal in size, as long as spikelet, very dissimilar, awnless; lower glume ± flattened on back, 2-keeled with inflexed margins, nerves present between keels; upper glume 1-keeled. **Florets** 2, *lower floret* sterile, reduced to a hyaline lemma, awnless or sometimes mucronate; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, entire or finely bidentate, awned or awnless; *awn* straight or geniculate, as long as to longer than body of lemma; *callus* very short, truncate, hairy with long, spreading hairs; *palea* minute. **Lodicules** 2, fleshy. **Stamens** 2 or 3. **Caryopsis** oblong to lanceolate. $x = 7$ (aneuploids, polyploidy).

Species ± 7, tropical and sthn Afr.; 2 in sthn Afr., N Namibia, N Botswana and mainly in the eastern and northern regions of South Africa with records from one small area near Cape Town.

Monelytrum Hack. ex Schinz 9902750

(Chloridoideae—Cynodonteae—Zoysiinae)

Schinz: 140 (1888); Schweickerdt: 71 (1946); Chippindall: 110 (1955); Launert: 131 (1970a); Clayton & Renvoize: 253 (1986); Gibbs Russell *et al.*: 222 (1990); Watson & Dallwitz: 618 (1994).

Perennial or annual, tufted, stoloniferous. **Leaf blade** expanded, mostly basal, cauline leaves few, linear, margins rigidly ciliate with tubercle-based hairs; *ligule* a fringed membrane. **Inflorescence** a false bristly spike with clusters of spikelets on a reduced axis, clusters are of 2–4 bisexual spikelets, 1–3 sterile and reduced spikelets, these often reduced to bristles; *spikelets* shortly pedicelled, pedicels conspicuously hairy. **Spikelet** 3–

mm long, dorsiventrally compressed, falling with glumes; *glumes* unequal; lower glume reduced to a small membranous, nerveless scale; upper glume elliptic-lanceolate, 5–7-nerved, herbaceous, scabrid and hairy, awned; awn longer than glume, scabrid. **Floret** 1, bisexual; *lemma* less firm than glumes, herbaceous, elliptic-lanceolate, hairy, 3-nerved, shortly awned; *awn* straight; *callus* present at base of clusters, hairy; *palea* broadly lanceolate, slightly thinner in texture than lemma. **Lodicules** 2, cuneate, glabrous. **Stamens** 3. **Ovary** ellipsoid; stigmas plumose.

Species 1: *Monelytrum luederitzianum* Hack., Namibia to S Angola.

Monocymbium Stapf 9900750

(Panicoideae—Andropogoneae—Anthistiriinae)

Stapf: 386 (1919); Stapf: 337 (1898) under *Andropogon* L.; Stent: 252 (1924); Chippindall: 515 (1955); Clayton & Renvoize: 823 (1982); Clayton & Renvoize: 358 (1986); Gibbs Russell *et al.*: 222 (1990); Watson & Dallwitz: 622 (1994).

Perennial, tufted, sometimes shortly rhizomatous. **Leaf blade** linear, tapering to a sharp point; expanded; *ligule* an unfringed membrane. **Inflorescence** of short, solitary spike-like racemes partly enclosed by a spathe and spatheole, these loosely gathered into an open false panicle; spatheoles on slender, filiform branches that are mostly in pairs or groups of three from upper nodes of culm; spatheole narrowly boat-shaped, reddish brown, acuminate, longer than enclosed raceme; *spikelets* paired, in long-short combination: one sessile, the other pedicelled. **Sessile spikelet** 3.5–4.0 mm long, dorsiventrally compressed, falling with glumes; *glumes* ± equal, dissimilar; lower glume lanceolate, flat with rounded sides, hairy, not grooved or 2-keeled, usually winged on upper portion; upper glume thinner in texture, boat-shaped, sometimes winged on upper portion of keel, awned from entire or minutely 2-lobed apex; awn fine, straight. **Florets** 2; *lower floret* sterile, reduced to a lemma, hyaline, hairy, awnless; *upper floret* bisexual; *lemma* less firm than glumes, cartilaginous with a hyaline base and margins, glabrous, deeply 2-lobed, awned from between lobes; *awn* delicate, much longer than body of lemma, geniculate, twisted, column glabrous; *callus* short, obtuse, applied obliquely to apex of internode; *palea* 0. **Lodicules** 2, cuneiform, glabrous. **Stamens** 3. **Ovary** ellipsoid, glabrous; stigmas plumose. **Caryopsis** oblong, slightly dorsiventrally compressed.

Pedicelled spikelet broadly lanceolate, resembling sessile spikelet but slightly longer and wider, male, awnless; callus linear. $x = 5, 10$ (polyploidy).

Species ± 4, tropical and sthn Afr.; 1 in sthn Afr.: *Monocymbium ceresiiforme* (Nees) Stapf, N Namibia, northern provinces of South Africa to Free State, KwaZulu-Natal, Lesotho and N Eastern Cape.

Mosdenia Stent 9902741

(Chloridoideae—Cynodonteae—Zoysiinae)

Stent: 170 (1922); Stent: 256 (1924); Chippindall: 108 (1955); Clayton & Renvoize: 255 (1986); Gibbs Russell *et al.*: 223 (1990); Watson & Dallwitz: 625 (1994).

Perennial, stoloniferous. **Leaf blade** expanded, linear to linear-lanceolate; *ligule* an unfringed membrane. **Inflorescence** a narrow, solitary, dense spike; *spikelets* solitary, sessile, in irregular whorls or spirals. **Spikelet** subfalcate, falling with glumes; *glumes* ± equal, ± equalling spikelet, rigidly membranous, very dissimilar, 1-nerved, glabrous, awnless; lower glume subacuminate, scabrid on nerve, slightly longer and broader than upper glume, boat-shaped; upper glume subfalcate, flat on back, slightly gibbous at base. **Floret** 1, bisexual; *lemma* less firm than glumes, delicately hyaline, lanceolate-ovate, 1–3-nerved, glabrous, acuminate, acute, awnless; *palea* ± as long as lemma, minutely bilobed, faintly 2-nerved. **Lodicules** 2, truncate. **Stamens** 3. **Ovary** ovoid, glabrous; style short, distinct, plumose. $x = 10$ (polyploidy).

Species 1, sthn Afr.: *Mosdenia leptostachys* (Ficalho & Hiern) Clayton, northern provinces of South Africa.

*__Nassella__ (Trin.) E.Desv. 9902650

(Pooideae—Stipeae)

Desvaux: 263 (1854); Chippindall: 287 (1955) under *Stipa* L.; Clayton & Renvoize: 84 (1986); Barkworth: 597 (1990); Gibbs Russell *et al.*: 224 (1990); Barkworth: 1 (1993); Watson & Dallwitz: 635 (1994).

Perennial, tufted. **Leaf blade** expanded to tightly rolled; *ligule* an unfringed membrane. **Inflorescence** an open or contracted panicle; *spikelets* all alike, pedicelled. **Spikelet** laterally compressed, plump and gibbous, disarticulating above glumes; *glumes* ± equal, longer than spikelet, similar, rounded on back, 3-nerved, awned or awnless. **Floret** 1; *lemma* cylindrical, convolute, firmer than glumes, becoming indurated, thick and stiff; margins strongly overlapping, awned asymmetrically; *awn* geniculate, robust, longer than body of lemma, apex fused at crown just below awn, crown often ciliate, cilia sometimes fused; *callus* short, blunt, hairy; *palea* one third or less length of lemma, glabrous, hyaline, nerveless. **Stamens** with anthers often of two different sizes even within same floret. **Ovary** glabrous. $x = 19$.

Species ± 15, South America, mainly Andes; ± 5 naturalised in sthn Afr., Western and Eastern Cape.

Odontelytrum Hack. 9901430

(Panicoideae—Paniceae—Cenchrinae)

Hackel: 86 (1898); Stapf: t. 3074 (1922); Stapf & Hubbard: 1086 (1934); Clayton & Renvoize: 668 (1982); Clayton & Renvoize: 305 (1986); Gibbs Russell *et al.*: 225 (1990); Watson & Dallwitz: 652 (1994).

Perennial, long-stoloniferous; culms many-noded, branched, floating, smooth, spongy. **Leaf blade** linear, expanded; *ligule* an unfringed membrane. **Inflorescence** spike-like, a coarse cylindrical raceme enveloped below by uppermost leaf sheath of which blade is as long as inflorescence; spikelet subtended by a solitary 4–6-lobed herbaceous scale or cupule, one lobe almost free, scabrid and awn-like, very long, the whole forming a purplish involucre-plus-bristle; *spikelets* solitary, supported on blunt stipe, falling entire with involucre and peduncle. **Spikelet** lanceolate, dorsiventrally compressed; *glumes* unequal, awnless; lower glume hyaline, nerveless, sometimes absent; upper glume shorter than spikelet, membranous, 1–3-nerved. **Florets** 2, *lower floret* male; lemma convex on back, acute, 9-nerved, awnless; palea well developed; *upper floret* bisexual; *lemma* firmer than glumes, as long as spikelet, cartilaginous below, entire, 7-nerved, margins flat and exposed on palea, tip caudate, awnless; *palea* as long as lemma, scaberulous on keels. **Lodicules** 0. **Stamens** 3. **Ovary** ellipsoid or obovoid; style long, stigma 1, shortly plumose, exserted from apex. **Caryopsis** oblong, dorsiventrally compressed.

Species 1: *Odontelytrum abyssinicum* Hack., tropical east Africa, from Ethiopia to sthn Afr., Mpumalanga.

Odyssea Stapf 9903451

(Chloridoideae—Eragrostideae—Eleusininae)

Stapf: t. 3100 (1922); Stapf: 539 (1900) under *Diplachne* P.Beauv.; Chippindall: 118 (1955); Launert: 132 (1970a); Phillips: 286 (1974); Clayton & Renvoize: 212 (1986); Gibbs Russell *et al.*: 225 (1990); Watson & Dallwitz: 654(1994).

Perennial, rhizomatous, mat-forming, prickly, rigid, glaucous. **Leaf blade** linear or linear-lanceolate, rigid,

thick, needle-like, pungent, flat or rolled, standing at an angle of ± 45 degrees to culm; *ligule* a fringe of hairs. **Inflorescence** a dense and spike-like panicle with short, crowded subsecund branches; *spikelets* 2-ranked, solitary, shortly pedicelled. **Spikelet** ± laterally compressed, disarticulating above glumes and between florets; *glumes* very unequal, similar, shorter than spikelet, scarious to membranous, narrowly ovate, rounded or weakly keeled, 1-nerved, subacute, awnless or minutely mucronate. **Florets** 4–9, bisexual, with *upper floret* reduced and sterile; *lemma* broadly elliptic, similar to firmer in texture to glumes, membranous, 3-nerved, lateral nerves long hairy all over, central nerve hairy towards base, hairs shorter, incised, shortly 2-lobed, mucronate or awned on back just below apex; *awn* short, stout; *callus* short, hairy; *palea* ± as long as lemma, lanceolate, truncate, 2-keeled, concave between keels, scabrid on keels, sparsely pilose. **Lodicules** 2, broadly cuneate, glabrous. **Stamens** 3; anthers long. **Ovary** obovoid; styles free, plumose. **Caryopsis** (achene) ellipsoid, with free pericarp.

Species 2, coastal Red Sea, tropical and sthn Afr.; 1 in sthn Afr.: *Odyssea paucinervis* (Nees) Stapf, Namibia, Botswana, Northern Province, North-West and northwest Western Cape.

Olyra L. 9901660

(Bambusoideae—Olyreae)

Linnaeus: 1261 (1759); Stapf: 746 (1900); Chippindall: 453 (1955); Clayton: 17 (1970); Launert: 23 (1971); Clayton & Renvoize: 62 (1986); Gibbs Russell *et al.*: 226 (1990); Watson & Dallwitz: 656 (1994).

Perennial, erect or straggling. **Leaf blade** expanded, ovate or ovate-lanceolate, long-acuminate, acute, with cross veins, contracted at base into a short pseudopetiole, disarticulating from sheaths; *ligule* an unfringed or a fringed membrane. **Inflorescence** a panicle, open or contracted, either solitary or two from upper leaf sheath; *spikelets* solitary, pedicelled, unisexual; male spikelets usually just below female spikelets on lower part of inflorescence. **Male spikelet** on filiform pedicels, narrow and smaller than female, readily deciduous; *glumes* 0 or represented by an obscure rim. **Floret** 1; *lemma* lanceolate, membranous, prominently keeled, 3-nerved, shortly awned; *palea* equalling or shorter than lemma, 2-nerved, membranous. **Lodicules** 3, rarely 2, small, cuneate. **Stamens** 3; anthers linear.

Female spikelet on clavate pedicels, dorsiventrally compressed; *glumes* unequal or ± equal, equal to longer than spikelet, ovate to lanceolate, herbaceous, 5–9-nerved, cross-veined, acuminate, awned; awn flexuous, longer than glume, up to 20 mm long. **Floret** 1; *lemma* becoming indurated, crustaceous, white, shining, ovate, elliptic or lanceolate, convex, dorsally obtuse, entire, awnless; *callus* 0; *palea* similar to lemma. **Lodicules** 3, truncate, cuneate. **Stamens** 0. **Ovary** ± ellipsoid, acuminate, glabrous; styles connate at base or beyond middle; stigmas plumose. $x = 7, 10, 11$ (polyploidy).

Species 23, mainly tropical and subtropical America and Africa; 1 in sthn Afr.: *Olyra latifolia* L., KwaZulu-Natal into Eastern Cape.

Oplismenus P.Beauv. 9901150

(Panicoideae—Paniceae—Setariinae)

Palisot de Beauvois: 14 (1810); Stapf: 415 (1899); Stent: 271 (1924); Chippindall: 362 (1955); Launert: 132 (1970a); Clayton & Renvoize: 541 (1982); Clayton & Renvoize: 271 (1986); Clayton: 6 (1989); Gibbs Russell *et al.*: 227 (1990); Watson & Dallwitz: 663 (1994).

Annual or perennial, trailing or scrambling, prostrate, shade-loving; culms slender and weak, often with aerial roots from nodes. **Leaf blade** broadly linear to ovate, expanded, often minutely cross-veined; *ligule* a short, fringed membrane or a fringe of hairs. **Inflorescence** of several 1-sided, spike-like racemes usually scattered and distant on slender central axis, racemes sometimes reduced to fascicles, rachis narrow; *spikelets* abaxial, solitary, paired, subsessile or shortly pedicelled. **Spikelet** lanceolate to oblong, weakly laterally compressed to not noticeably or dorsiventrally compressed, falling with glumes; *glumes* ± equal, similar, shorter than spikelet, membranous, elliptic, 3–5-nerved, sometimes hairy, lower or both glumes long-awned from apex; awn of lower glume always longer. **Florets** 2; *lower floret* male (rarely) or sterile; lemma acute or very shortly awned; palea usually 0; *upper floret* bisexual; *lemma* dorsally compressed, similar in texture to glumes, coriaceous, lanceolate to elliptic, entire, shortly apiculate or obtuse, glabrous, smooth, shining, margins inrolled and clasping palea, awnless; *callus* hairy; *palea* acute, relatively long, hyaline, 2-nerved. **Lodicules** 2, broadly cuneate, often very delicate. **Stamens** 3. **Ovary** ellipsoid, glabrous; styles distinct, plumose. **Caryopsis** oblong to ellipsoid. $x = 9, 10, 11$ (high polyploidy).

Species 5, tropics and subtropics; 3 in sthn Afr., Caprivi in Namibia, N Botswana, northern provinces of South Africa to Swaziland, KwaZulu-Natal and Eastern Cape.

Oropetium Trin. 9903200

(Chloridoideae—Eragrostideae—Eleusininae)

Trinius: 98 (1820); Stapf: 741 (1900); Stent: 303 (1924); Phillips: 146 (1951); Chippindall: 204 (1955); Renvoize: 306 (1974); Phillips: 467 (1975); Clayton & Renvoize: 211 (1986); Gibbs Russell *et al.*: 228 (1990); Watson & Dallwitz: 668 (1994).

Perennial, small, densely tufted, cushion-forming, leaves mainly basal. **Leaf blade** rolled, folded or flat; *ligule* a short, fringed, hyaline membrane. **Inflorescence** a solitary, slender, straight or gradually curved terminal spike; *spikelets* sessile, solitary, closely or loosely 2-ranked on opposite or subopposite sides of rachis, ± embedded in rachis; rachis tough or fracturing tardily in segments of 1–4(8) spikelets. **Spikelet** 2.5–4.5 mm long, laterally compressed; *glumes* of terminal spikelet equal and similar; glumes of lateral spikelets unequal, dissimilar, awnless; lower glume suppressed or reduced; upper glume narrowly lanceolate to lanceolate, rigid except at hyaline margins, subacute to acuminate, (1–)3-nerved. **Floret** 1, (rarely 2), bisexual; *lemma* oblong or lanceolate, membranous, distinctly or obscurely keeled, at least in upper part, finely 1–3-nerved, hairy along nerves, truncate or minutely 3-lobed, mucronate; *palea* equalling lemma, faintly 2-nerved. **Lodicules** 2, minute, cuneate. **Stamens** 3; anthers minute. **Ovary** glabrous; styles slender, distinct, plumose. **Caryopsis** ellipsoid-oblong. $x = 10$ (polyploidy).

Species 3–6, dry areas of India and Africa; 1 in sthn Afr.: *Oropetium capense* Stapf, widespread.

Oryza L. 9901580

(Bambusoideae—Oryzeae)

Linnaeus: 333 (1753); Stent: 274 (1924); Chippindall: 32 (1955); Launert: 134 (1970a); Clayton: 28 (1970); Launert: 31 (1971); Clayton & Renvoize: 71 (1986); Gibbs Russell *et al.*: 229 (1990); Watson & Dallwitz: 672 (1994).

Annual or perennial, tufted, sometimes decumbent, long rhizomatous, rooting at nodes. **Leaf blade** expanded, long-linear usually auriculate; *ligule* a long, firm, unfringed membrane. **Inflorescence** an open or contracted panicle; *spikelets* solitary, shortly pedicelled; pedicels linear, somewhat cup-shaped at apex. **Spikelet** unconventional, strongly laterally compressed, scabrid to hispid; *glumes* 0 and represented by a small, 2-lobed cu-

pule, or present and then ± equal, reduced and small, suborbicular, thinly membranous, nerveless, acuminate, awnless. **Florets** 3, *lower florets* 2, sterile, reduced to narrow or bristle-like lemmas, much shorter than spikelet; *upper floret* bisexual; *lemma* coriaceous, oblong to elliptic, strongly keeled, rigidly ciliate, scabrid, rugose, strongly 3–9-nerved, apex obtuse or acute, (mucronate or awnless in cultivated forms) or awned; *awn* straight, sometimes flexous, much longer than body of lemma, 10–160 mm long, scabrid; *palea* as long as lemma and similar in texture, 3-nerved. **Lodicules** elliptic-lanceolate to obovate, 2-lobed, rarely entire. **Stamens** 6; anthers linear. **Ovary** glabrous; styles short, free; stigmas plumose. **Caryopsis** not grooved. $x = 12$ (polyploidy).

Species ± 25, throughout tropics and subtropics; 3 in sthn Afr., northern regions of Namibia and Botswana, Northern Province, Swaziland and KwaZulu-Natal.

Oryzidium C.E.Hubb. & Schweick. 9901142

(Panicoideae—Paniceae—Setariinae)

Hubbard & Schweickerdt: 326 (1936); Chippindall: 425 (1955); Launert: 134 (1970a); Clayton & Renvoize: 281 (1986); Clayton: 58 (1989); Gibbs Russell *et al.*: 230 (1990); Watson & Dallwitz: 674 (1994).

Perennial, stoloniferous, rooting from lower nodes, floating; culms soft, spongy and compressible. **Leaf blade** expanded, linear, leaf sheaths broad, papery; *ligule* a very short fringe of hairs. **Inflorescence** a panicle, somewhat contracted; *spikelets* solitary, pedicelled, pedicels coarsely scabrid. **Spikelet** lanceolate, dorsiventrally compressed, falling with glumes and pedicels; *glumes* very unequal in size, dissimilar in appearance, 3–7-nerved; lower glume usually reduced to an ovate, membranous scale, minutely awned; upper glume lanceolate, as long as spikelet, stiffly membranous, scabrid on nerves, produced at apex into an stiff awn; awn 3 or 4 times as long as body of glume, scabrid. **Florets** 2; *lower floret* male, separated from upper floret by a long rachilla internode; lemma lanceolate, membranous, 5-nerved, awned; palea shorter than lemma, subhyaline; *upper floret* bisexual; *lemma* similar to, to firmer in texture than glumes, acute, entire, glabrous, 7-nerved, mucronate, margins flat and exposed on palea, *palea* similar to lemma. **Lodicules** 2, cuneate. **Stamens** 3. **Ovary** ellipsoid, glabrous; style distinct, plumose.

Species 1, southern tropical Africa: *Oryzidium barnardii* C.E.Hubb. & Schweick., Namibia and N Botswana.

Oxyrhachis Pilg. 9900341

(Panicoideae—Andropogoneae—Rottboelliinae)

Pilger: 655 (1932); Clayton & Renvoize: 855 (1982); Clayton & Renvoize: 368 (1986); Gibbs Russell *et al.*: 231 (1990); Watson & Dallwitz: 681 (1994).

Perennial, tufted. **Leaf blade** linear, folded or rolled; *ligule* a fringed membrane or a fringe of hairs. **Inflorescence** terminal, with a single cylindrical raceme; spikelets apparently borne singly since pedicels fused to rachis and indistinguishable from internode; internodes semicylindrical and strongly oblique top and bottom; *spikelets* sunken, sessile. **Sessile spikelet** dorsiventrally compressed, falling with glumes and adjacent joint; *glumes* ± equal, rounded on back, awnless, dissimilar; lower glume lanceolate, obtuse, smooth, rounded on flanks, wingless; upper glume apically notched or entire. **Florets** 2, *lower floret* sterile, reduced to hyaline lemma, awnless, palea 0; *upper floret* bisexual, *lemma* less firm in texture than glumes, 2-nerved, entire, awnless; *callus* obtuse; *palea* small or suppressed. **Lodicules** 2, fleshy, glabrous. **Stamens** 3. **Ovary** glabrous. **Caryopsis** oblong-ellipsoid, dorsiventrally compressed.

Pedicelled spikelet and pedicel suppressed or fused and indistinguishable from internode.

Species 1, Africa and Madagascar: *Oxyrhachis gracillima* (Baker) C.E.Hubb., S KwaZulu-Natal and Eastern Cape.

Oxytenanthera Munro 9904770

(Bambusoideae—Bambuseae—Melocanninae)

Munro: 126 (1868); Henkel: 244 (1927); Clayton: 11 (1970); Clayton & Renvoize: 56 (1986); Gibbs Russell *et al.*: 232 (1990); Watson & Dallwitz: 683 (1994).

Perennial, tufted, with woody culms; culm sheath blades narrow. **Leaf blade** linear-lanceolate to lanceolate, pseudopetiolated, expanded, deciduous from sheath. **Inflorescence** a dense, spiny, globose cluster of spikelets at tips of leafy branchlets, each spikelet cluster subtended by a short-bladed papery sheath, and individual spikelets subtended by several short papery bracts. **Spikelet** falling entire at maturity; *glumes* unequal, 17–30-nerved with cross-nerves connecting them. **Florets** 1–4; *lower florets* male or sterile; *upper florets* bisexual; *lemma* 11–23-nerved with cross-nerves, apically awned; *palea* 16–19-nerved. **Lodicules** usually 0. **Stamens** 6; filaments united. **Ovary** glabrous; apical appendage long, stiff and tapering. $x = 12$ (polyploidy).

Species 1, Africa: *Oxytenanthera abyssinica* (A.Rich.) Munro, specimens from Northern Province resemble this species vegetatively but until flowering material is obtained the identification will remain tentative.

Panicum L. 9901160

(Panicoideae—Paniceae—Setariinae)

Linnaeus: 55 (1753); Stapf: 382 (1898); Stent: 263 (1924); Chippindall: 321 (1955); Launert: 135 (1970a); Clayton & Renvoize: 461 (1982); Clayton & Renvoize: 272 (1986); Webster: 118 (1987); Renvoize: 9 (1989); Gibbs Russell *et al.*: 233 (1990); Watson & Dallwitz: 684 (1994).

Psilochloa Launert: 156 (1970b).

Annual or perennial, of various habit. **Leaf blade** linear-lanceolate or long-linear, expanded or rolled; *ligule* an unfringed or a fringed membrane or a fringe of hairs. **Inflorescence** a panicle, open or rarely contracted; *spikelets* pedicelled. **Spikelet** lanceolate, oblong, elliptic or almost spherical, usually dorsiventrally compressed, usually falling with glumes; *glumes* unequal, rarely equal, membranous to hyaline, dissimilar or similar, usually awnless; lower glume usually shorter than spikelet, 0–7-nerved, awnless or minutely awned; upper glume as long as spikelet, 3–14-nerved. **Florets** 2; *lower floret* male or sterile; lemma very similar to upper glume, with or without a palea; *upper floret* bisexual, *lemma* similar to firmer in texture than glumes, usually becoming indurated, elliptic, ovate-elliptic or rarely oblong, obtuse or subacute, smooth or transversely rugose, glabrous, margins inrolled and clasping edges of palea, awnless; *palea* similar to and subequalling lemma, often with marginal flaps at base. **Lodicules** 2, broadly cuneate. **Stamens** 3. **Ovary** ellipsoid, glabrous; styles distinct, plumose above. **Caryopsis** ± ellipsoid, dorsiventrally compressed. $x = 7, 9, 10$ (high polyploidy).

Species ± 470, tropical, subtropical and warm temperate; 42 in sthn Afr., widespread.

*__Parapholis__ C.E.Hubb. 9904431

(Pooideae—Hainardieae)

Hubbard: 14 (1946); Chippindall: 73 (1955); Tutin: 243 (1980); Clayton & Renvoize: 111 (1986); Gibbs Russell *et al.*: 243 (1990); Watson & Dallwitz: 692 (1994).

Annual, tufted, erect to prostrate. **Leaf blade** linear, expanded or rolled, apex acute; *ligule* an unfringed membrane. **Inflorescence** a single, slender, ± curved, rigid,

cylindrical spike; spikelets sunk in and closely pressed to rachis, alternating on opposite sides of rachis; *spikelets* solitary, sessile. **Spikelet** ± laterally compressed, falling with glumes and internodes of rachis at maturity; *glumes* ± equal, displaced side by side, similar, as long as spikelet, narrow, acute, glabrous, 3–5-nerved, thick and rigid, awnless. **Floret** 1, bisexual; *lemma* almost as long as glumes, less firm in texture than glumes, thinly membranous, lanceolate to narrowly ovate, 3-nerved, lateral nerves short, awnless; *palea* almost as long as lemma, 2-nerved, keels wingless. **Lodicules** 2. **Stamens** 3. **Ovary** glabrous, truncate; styles obsolete, plumose. **Caryopsis** narrowly ellipsoid. x = 7, 9, 19 (polyploidy).

Species 6, Europe and Asia; 1 naturalised in sthn Afr.: **Parapholis incurva* (L.) C.E.Hubb., W Northern Cape and Western Cape.

Paratheria Griseb. 9901420

(Panicoideae—Paniceae—Cenchrinae)

Grisebach: 236 (1866); Stapf & Hubbard: 1084 (1934); Launert: 143 (1970a); Clayton & Renvoize: 305 (1986); Clayton: 188 (1989); Gibbs Russell *et al.*: 243 (1990); Watson & Dallwitz: 693 (1994).

Perennial, tufted, often rooting at nodes. Culms slender, ascending, geniculate, branched. **Leaf blade** linear, expanded; *ligule* a fringed membrane or a fringe of hairs. **Inflorescence** a solitary, terminal, contracted panicle, branches appressed to central axis, each branch disarticulating with a spikelet; *spikelets* solitary, surrounded by a ring of short hairs at base, subtended by a long, robust, awn-like bristle, supported on a long, pungent callus beneath spikelet, callus constituting stipe; *cleistogamous spikelets* resembling normal spikelets except for absence of bristle, occurring at base of inflorescence and hidden in uppermost leaf sheaths. **Spikelet** dorsiventrally compressed; *glumes* ± equal, minute, rarely 0, similar, glabrous, awnless. **Florets** 2, lower sterile, reduced to a lemma, dorsally flattened, 7–11-nerved, awnless; palea 0; *upper floret* bisexual; *lemma* firmer than glumes, similar to lower floret but convex dorsally, 7-nerved, glabrous, margins flat and exposed on palea, acuminate, awnless; *palea* ± as long as lemma. **Lodicules** 2. **Stamens** 3. **Ovary** glabrous. x = 9.

Species 2, tropical west Africa, Madagascar, Cuba and Brazil; 1 in sthn Afr.: *Paratheria prostrata* Griseb., Namibia, in Okavango River.

Paspalidium Stapf 9901090

(Panicoideae—Paniceae—Setariinae)

Stapf: 582 (1920); Chippindall: 365 (1955); Launert: 144 (1970a); Clayton & Renvoize: 551 (1982); Clayton & Renvoize: 291 (1986); Clayton: 109 (1989); Gibbs Russell *et al.*: 244 (1990); Veldkamp: 374 (1994) as *Setaria*; Watson & Dallwitz: 699 (1994).

Annual or perennial, rhizomatous or stoloniferous, rooting from lower nodes, sometimes floating. **Leaf blade** expanded or rolled, linear; *ligule* a fringed membrane to a fringe of hairs. **Inflorescence** an elongated, secund, false spike consisting of several sessile, spike-like, 1-sided racemes scattered singly on alternate sides and ± appressed to long central axis; rachis triquetrous or winged, usually ending in an inconspicuous point; *spikelets* solitary or paired, often in 2 rows, sessile or very shortly pedicelled; abaxial (upper) glume turned away from rachis. **Spikelet** ovate, dorsiventrally compressed, falling with glumes; *glumes* unequal, awnless; lower glume a small membranous scale, 1–5-nerved; upper glume up to two-thirds as long as spikelet, 3–11-nerved, membranous. **Florets** 2; *lower floret* male or sterile; lemma membranous, ± oblong-elliptic, rounded dorsally, subacute, 5–7-nerved, awnless; palea thinly membranous, equalling lemma; *upper floret* bisexual; *lemma* firmer than glumes, broadly elliptic, rounded dorsally, almost as long as spikelet, glabrous, rugose, entire, margins inrolled and clasping edges of palea, awnless; *palea* elliptic-lanceolate, acute, tip often briefly reflexed, flat and 2-keeled with margins involute, indurated. **Lodicules** 2, broadly cuneate, fleshy. **Stamens** 3. **Ovary** glabrous; styles connate at base, plumose. **Caryopsis** ellipsoid, dorsiventrally compressed. x = 9 (polyploidy).

Species ± 40, warmer regions of both hemispheres; 2 in sthn Afr., N Namibia and Botswana, northern provinces of South Africa and KwaZulu-Natal.

Paspalum L. 9901070

(Panicoideae—Paniceae—Setariinae)

Linnaeus: 855 (1759); Stapf: 369 (1898); Stent: 258 (1924); Chippindall: 386 (1955); Clayton & Renvoize: 607 (1982); Clayton & Renvoize: 287 (1986); Clayton: 88 (1989); Gibbs Russell *et al.*: 245 (1990); Watson & Dallwitz: 701 (1994).

Perennial, of varying habit. **Leaf blade** long-linear, expanded, rarely folded or with inrolled margins; *ligule* an unfringed membrane. **Inflorescence** of spike-like, 1-sided racemes, digitate to subdigitate or scattered up central axis, rarely solitary; rachis flat dorsally, with a raised midrib on front, bearing spikelets alternately on either side of midrib in 2 or 4 rows; *spikelets* solitary or paired, subsessile or unequally pedicelled; lower glume abaxial and upper lemma facing rachis. **Spikelet** strongly plano-convex, orbicular to oblong to lanceolate, dorsiventrally compressed, disarticulating with glumes; *glumes* unequal, dissimilar, awnless; lower glume 0 or scale-like, rarely up to half the spikelet length; upper glume as long as spikelet, convex dorsally, 3–5-nerved, nerves curved, membranous. **Florets** 2; *lower floret* sterile, reduced to a lemma; lemma equal and similar to upper glume but flat on back, awnless; *upper floret* bisexual; *lemma* similar in texture to, to firmer than glumes, chartaceous to crustaceous, smooth to rugose, obtuse, entire, faintly nerved, glabrous, sometimes minutely punctiform, margins narrow and inrolled, clasping only edges of palea, awnless; *palea* subequal to and similar in texture to lemma, obtuse or acute. **Lodicules** 2, broadly cuneate. **Stamens** 3. **Ovary** glabrous; styles distinct or united at base, plumose. **Caryopsis** plano-convex. x = 10, 12 (high polyploidy).

Species ± 330, tropics, predominately New World; 6 in sthn Afr., widespread.

Pennisetum Rich. 9901390

(Panicoideae—Paniceae—Cenchrinae)

Richard: 72 (1805); Stapf: 430 (1899); Stent: 273 (1924); Chippindall: 439 (1955); Launert: 146 (1970a); Burken: 161 (1977); Clayton & Renvoize: 672 (1982); Clayton & Renvoize: 303 (1986); Clayton: 178 (1989); Gibbs Russell *et al.*: 247 (1990); Watson & Dallwitz: 703 (1994).

Beckeropsis Fig. & De Not.: 49 (1853).

Annual or perennial, tufted, stoloniferous, rhizomatous. **Leaf blade** narrow-linear, expanded, folded or rolled; *ligule* a fringed membrane or a fringe of hairs. **Inflorescence** a solitary, terminal, cylindrical to subglobose spike-like panicle, branches short or reduced to stumps, rarely axillary, then gathered into a leafy false panicle, or 2–4 spikelets enclosed in uppermost sheath (*P. clandestinum*); spikelets subtended by an involucre of filiform or slender, glabrous, scabrid or plumose, rarely solitary bristles, free to base, falling with spikelets at maturity (except in cultivated forms); *spikelets* solitary or in clusters of 2–5, outer often reduced, sessile or shortly pedicelled. **Spikelet** narrowly lanceolate to oblong, dorsiventrally compressed to subterete; *glumes* unequal, awnless; lower glume up to half as long as

spikelet, sometimes suppressed, thinly membranous, nerveless or 1–5-nerved; upper glume very small to as long as spikelet, 1–11-nerved. **Florets** 2; *lower floret* male or sterile; lemma lanceolate or ovate-lanceolate, membranous, of variable length, acuminate, acute, 1–15-nerved, awnless or awned; palea well developed or reduced or 0; *upper floret* bisexual; *lemma* as long as or little shorter than spikelet, similar to firmer than glumes, membranous to thinly coriaceous, entire, 5–7-nerved, flat, thin margins covering ± half of palea, mucronate to awned; *palea* subequal and similar in texture to lemma, 2-nerved. **Lodicules** small, 2 or 0. **Stamens** 3; tips of anthers glabrous or minutely penicillate. **Ovary** ellipsoid; style distinct or connate below. **Caryopsis** oblong and dorsiventrally compressed to subglobose. $x = 9$ (aneuploids, polyploidy).

Species ± 80, cosmopolitan in tropical and warm regions; 14 in sthn Afr., widespread.

Pentameris P.Beauv. 9902080

(Arundinoideae—Arundineae)

Palisot de Beauvois: 92 (1812); Stapf: 512 (1899); Schweickerdt: 43 (1938); Chippindall: 251 (1955); Clayton & Renvoize: 174 (1986); Gibbs Russell *et al.*: 251 (1990); Barker: 25 (1993); Watson & Dallwitz: 705 (1994).

Perennial, tufted or decumbent, up to 650 mm tall, sometimes cushion-like. **Leaf blade** long-linear, hard, rigid, wiry or flat and open, often strongly curved or curled, usually tightly rolled at an early stage; *ligule* a fringe of hairs. **Inflorescence** a large, open or somewhat contracted panicle with 5–20 spikelets; *spikelets* solitary, pedicelled. **Spikelet** laterally compressed, disarticulating above glumes; *glumes* ± equal, much longer than spikelet, similar, membranous to chartaceous, 1–3-nerved, glabrous or hairy, awned or awnless. **Florets** 1 or 2, sometimes with rudiments of a third floret, bisexual; *lemma* similar in texture to firmer than glumes, membranous, oblong, 7–9(–11)-nerved, not keeled, hairy from between nerves, 2-lobed, lobes entire or shortly 2-toothed, each with a loosely twisted or straight bristle or awn from inner margin, *central awn* from between lobes, 4 or 5 times as long as lemma; awn flat, twisted, geniculate; *callus* short, blunt, hairy; *palea* ± as long as lemma, 2-keeled, hairy between keels, 2-toothed at apex. **Lodicules** 2, glabrous or ciliolate. **Stamens** 3. **Ovary** obovoid, with a dense tomentum of branched hairs at apex; styles distinct, short, plumose. **Fruit** an achene with free pericarp, fusiform, subglobose to globose or cuneate.

Species 9, sthn Afr., mainly mountainous areas of Western Cape into adjoining regions of Eastern Cape.

Pentaschistis (Nees) Spach 9902050

(Arundinoideae—Arundineae)

Spach: 164 (1846); Stapf: 480 (1899); Chippindall: 254 (1955); Clayton & Renvoize: 174 (1986); Gibbs Russell *et al.*: 253 (1990); Linder & Ellis: 1 (1990); Watson & Dallwitz: 709 (1994).

Achneria Benth. & Hook.f.: 1158 (1883) not of P.Beauv. (1812); Stapf: 456 (1899). *Poagrostis* Stapf: 760 (1900); Chippindall: 272 (1955).

Perennial, rarely annual, tufted, sometimes rhizomatous, occasionally cushion-forming. **Leaf blade** variable, often with few to many linear, tubercular, stalked or saucer-shaped glands, particularly on nerves and margins; *ligule* a fringe of hairs. **Inflorescence** an open, contracted panicle or sometimes spike-like; *spikelets* solitary, pedicelled. **Spikelet** 2–20 mm long, laterally compressed, disarticulating above glumes; *glumes* ± equal, as long as to longer than spikelet (excluding awns), similar, lanceolate, 1-nerved, 1-keeled, often glandular on keels, glabrous to puberulous all over, obtuse or acute or acuminate, usually awnless. **Florets** 2, rarely 1 (occasionally with rudiments of a third), bisexual; *lemma* 1.5–8.0 mm long, similar in texture to glumes, membranous, rounded on back, hairy or glabrous, ± 7–9-nerved, 2-lobed, lobes awnless or awned; *awn* straight, shortly or partly fused to inner margin of lobe, central awn from between lobes or awnless, rarely only upper lemma awned; *awn* varying greatly in length, usually flat and twisted in lower part, geniculate, often longer than body of lemma; *callus* short, blunt, hairy; *palea* 2-keeled, bidentate apically, ± as long as lemma, membranous. **Lodicules** 2, small. **Stamens** 3. **Ovary** oblong, glabrous; styles distinct, slender, plumose. $x = 7, 10, 13$ (polyploidy).

Species ± 65, mainly Africa, also in Madagascar; 56 in sthn Afr., mainly in mountainous areas, S Namibia, northern provinces of South Africa, Free State, KwaZulu-Natal, Lesotho, W Northern Cape and Western Cape.

***Periballia** Trin. 9901870

(Pooideae—Aveneae—Aveninae)

Trinius: 133 (1820); Clayton & Renvoize: 131 (1986); Gibbs Russell *et al.*: 265 (1990); Watson & Dallwitz: 711 (1994).

Annual, tufted or culms solitary. **Leaf blade** linear, expanded or rolled; *ligule* an unfringed membrane. **Inflorescence** an open panicle; *spikelets* not secund, pedicelled. **Spikelet** small, less than 3 mm long, laterally compressed, disarticulating above glumes; *glumes* ± equal, shorter than spikelet, similar, membranous, 1–3-nerved, awnless. **Florets** 2, bisexual, separated by an elongated internode; *lemma* lanceolate, rounded on back, irregularly toothed, 3–7-nerved, awnless; *callus* hairy; *palea* shorter than lemma, rounded on back. **Lodicules** 2. **Stamens** 3. **Ovary** glabrous. **Caryopsis** narrowly oblong, flattened on one face. $x = 7$ (4).

Species 3, Mediterranean; 1 naturalised in sthn Afr.: **Periballia minuta* (L.) Asch. & Graebn., Western Cape.

Perotis Aiton 9902800

(Chloridoideae—Cynodonteae—Zoysiinae)

Aiton: 85 (1789); Stapf: 575 (1899); Stent: 256 (1924); Chippindall: 109 (1955); Launert: 149 (1970a); Clayton: 394 (1974); Clayton & Renvoize: 255 (1986); Gibbs Russell *et al.*: 265 (1990); Watson & Dallwitz: 713 (1994).

Annual or perennial (short-lived), loosely tufted. **Leaf blade** linear-lanceolate, expanded, acute, margins often fringed with bristle-like hairs; *ligule* an unfringed to fringed membrane. **Inflorescence** a solitary, cylindrical, terminal spike or spike-like raceme, appearing plumose or like a bottle-brush because of long capillary glume awns; *spikelets* solitary, subsessile to pedicelled. **Spikelet** small, 1.2–5.5 mm long, laterally compressed, falling with glumes; *glumes* ± equal, membranous, linear or linear-lanceolate, similar, 1-nerved, keeled, finely scabrid, awned; awn capillary, much longer than glumes. **Floret** 1, bisexual; *lemma* much shorter than glumes, less firm than glumes, hyaline, lanceolate, acute, 1-nerved, glabrous, awnless; *palea* very small, hyaline, nerveless. **Lodicules** 2, broad, cuneate. **Stamens** 3. **Ovary** ± ellipsoid, glabrous; styles short, united at base, plumose. **Caryopsis** linear-lanceolate, almost as long as glumes at maturity. $x = 10$ (9) (polyploidy).

Species ± 10, Africa to Asia and Australia; 3 in sthn Afr., N Namibia, Botswana, northern provinces of South Africa, Swaziland and KwaZulu-Natal.

Phacelurus Griseb. 9900180

(Panicoideae—Andropogoneae—Rottboelliinae)

Grisebach: 428 (1846); Chippindall: 488 (1955) under *Ischaemum* L.; Clayton: 175 (1978); Gibbs Russell *et al.*: 349 (1990); Watson & Dallwitz: 718 (1994).

Perennial, tufted. **Leaf blade** linear, flat or folded, rarely terete; *ligule* an unfringed membrane. **Inflorescence** terminal, usually of many, ± flattened racemes, digitate to subdigitate, disarticulating transversely and often tardily, internodes and pedicels stout, clavate to inflated; *spikelets* in pairs, in long-short combinations: one sessile, the other pedicelled, pedicels free of rachis. **Sessile spikelet** 6–8 mm long, dorsiventrally compressed, falling with glumes; *glumes* ± equal, glabrous, dissimilar, awnless; lower glume flattened on back, 2-keeled, strongly ridged due to prominent nerves. **Florets** 2; *lower floret* male with a palea, or sterile and reduced to a lemma, awnless; *upper floret* bisexual; *lemma* entire, less firm in texture than glumes, hyaline, awnless; *callus* truncate, minute. **Lodicules** 2, fleshy, glabrous. **Stamens** 3. **Ovary** glabrous. **Caryopsis** oblong, dorsiventrally compressed.

Pedicelled spikelet resembling sessile spikelet, but usually smaller, awnless, male or sterile, rarely bisexual. $x = 10$ (polyploidy).

Species ± 9, Africa to Indo-China and Japan; 1 in sthn Afr.: *Phacelurus franksiae* (J.M.Wood) Clayton, Drakensberg (KwaZulu-Natal).

*Phalaris L. 9901630

(Pooideae—Aveneae—Aveninae)

Linnaeus: 54 (1753); Stapf: 682 (1900); Stent: 275 (1924); Chippindall: 88 (1955); Anderson: 1 (1961); Hubbard: 95 (1970); Launert: 81 (1971); Clayton & Renvoize: 133 (1986); Gibbs Russell *et al.*: 267 (1990); Watson & Dallwitz: 722 (1994); Baldini: 265 (1995).

Annual or perennial, tufted, rhizomatous, sometimes geniculate. **Leaf blade** linear to linear-lanceolate, expanded; *ligule* a conspicuous, unfringed membrane. **Inflorescence** a dense, oblong or spike-like panicle, sometimes subcapitate or interrupted and lobed, (*P. paradoxa*: 1 fertile spikelet surrounded by 5 or 6 sterile spikelets, these often reduced to clavate knobs; the whole falling as a unit); *spikelets* shortly pedicelled. **Spikelet** strongly laterally compressed, disarticulating above glumes; *glumes* ± equal, completely enclosing lemma, membranous, boat-shaped, almost plano-convex in outline, subobtuse, 3-nerved, strongly keeled, keels often winged and toothed. **Florets** 3, *lowest* 2 *florets* sterile, reduced to rudimentary lemmas, varying from very small to more than half as long as upper lemma, glabrous; *uppermost floret* bisexual; *lemma* firmer than glumes, chartaceous, ovate-elliptic or ovate-lanceolate, usually softly hairy, 5-nerved, obtuse or acute, awnless; *palea* relatively long, keelless. **Lodicules** 2, membranous, hyaline. **Stamens** 3. **Ovary** ellipsoid; styles distinct, plumose. **Caryopsis** ellipsoid. $x = 6, 7$ (aneuploids, high polyploidy).

Species ± 16, north temperate, but mostly from Mediterranean region, also South America; 6 in sthn Afr., widespread weeds or escapes from cultivation.

Phragmites Adans. 9902140

(Arundinoideae—Arundineae)

Adanson: 34, 559 (1763); Stapf: 540 (1899); Stent: 295 (1924); Chippindall: 228 (1955); Clayton: 113 (1967a); Clayton: 168 (1968); Clayton: 117 (1970); Gordon-Gray & Ward: 1 (1971); Launert: 91 (1971); Clayton & Renvoize: 182 (1986); Gibbs Russell *et al.*: 269 (1990); Watson & Dallwitz: 729 (1994).

Perennial, robust, tall reed, long-rhizomatous. **Leaves** cauline; leaf blade long, linear-lanceolate to lanceolate, expanded or inrolled from margins, deciduous at base of blade or at base of leaf sheath; *ligule* a fringed membrane or a fringe of hairs. **Inflorescence** a large, drooping, densely plumose panicle, open or contracted; *spikelets* solitary, pedicelled. **Spikelet** laterally compressed, disarticulating above glumes; *glumes* very unequal, shorter than spikelet, membranous, 3–5-nerved, acuminate, subacute. **Florets** 3–11; *lowermost floret* male or sterile, usually 3-nerved, acuminate, awnless; *succeeding florets* bisexual or rarely uppermost reduced; *lemma* decreasing in size upwards, similar in texture to glumes, membranous, linear-lanceolate, 1–3-nerved, glabrous but enveloped by long, silky hairs from callus, finely acuminate or tapering into an awn; *awn* straight, shorter than body of lemma; *callus* long, slender, blunt, hairy with long, silky hairs; *palea* shorter than lemma, oblong, linear-oblong or ovate-lanceolate; obtuse, 2-keeled, membranous or subhyaline. **Lodicules** 2. **Stamens** 3, sometimes 2 in lowest male floret, if present. **Ovary** glabrous; style distinct, stigma plumose. $x = 12$ (aneuploids, high polyploidy).

Species ± 3, cosmopolitan; 2 in sthn Afr., widespread in aquatic or semi-aquatic habitats.

Poa L. 9904070

(Pooideae—Poeae)

Linnaeus: 67 (1753); Stapf: 711 (1900); Stent: 302 (1924); Chippindall: 51 (1955); Clayton: 43 (1970); Launert: 152 (1970a); Launert: 47 (1971); Edmondson: 159 (1980); Clayton & Renvoize: 101 (1986); Gibbs Russell *et al.*: 270 (1990); Watson & Dallwitz: 748 (1994).

Annual or perennial, tufted or decumbent, sometimes rhizomatous, stoloniferous, sometimes geniculate. **Leaf blade** expanded, rolled or folded; apex often boat-shaped; *ligule* an unfringed or rarely a fringed membrane. **Inflorescence** a panicle, open and often effuse or contracted; *spikelets* solitary, pedicelled, pedicels swollen at apex. **Spikelets** 3–6 mm long, laterally compressed, disarticulating above glumes, sometimes viviparous; *glumes* usually ± equal, rarely unequal, shorter than spikelet, similar, membranous, ovate or oblong, acute to obtuse, with median keel, awnless, mucronate or rarely awned; lower glume 1–3-nerved; upper glume usually 3-nerved. **Florets** 2–6, bisexual or uppermost reduced; *lemmas* decreasing in size upwards, similar in texture to glumes, membranous, lanceolate or oblong, obtuse or subacute, 5–7(–11)-nerved, entire, median-keeled, keel glabrous or hairy, especially towards base, usually awnless, rarely mucronate or awned; *callus* often with long woolly hairs; *palea* subequalling lemma, 2-keeled, thinner in texture than lemma. **Lodicules** 2, ± 2-lobed. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose. **Caryopsis** ellipsoid to ovoid. $x = 7$ (aneuploids, high polyploidy).

Species ± 500, cosmopolitan; 6 in sthn Afr., widespread.

Pogonarthria Stapf 9903340

(Chloridoideae—Eragrostideae—Eleusininae)

Stapf: 316 (1898); Stent: 295 (1924); Chippindall: 184 (1955); Launert: 303 (1966); Launert: 152 (1970a); Phillips: 267 (1974); Clayton & Renvoize: 220 (1986); Gibbs Russell *et al.*: 272 (1990); Watson & Dallwitz: 756 (1994).

Annual or perennial, tufted, sometimes rhizomatous. **Leaf blade** linear, expanded or rolled; *ligule* a fringe of hairs. **Inflorescence** of many 1-sided, spike-like racemes on a long central axis; racemes solitary or whorled, sometimes stiff, spreading, straight or curved like a herringbone; *spikelets* solitary, shortly pedicelled. **Spikelet** 3–10 mm long, laterally compressed, disarticulating above glumes and variously between florets; *glumes* very unequal, similar, shorter than spikelet, coriaceous,

acute or acuminate, keeled, 1-nerved, awnless; lower glume ± half as long as upper. **Florets** 4–11, bisexual, sometimes uppermost reduced, decreasing in size upwards; *lemma* similar in texture to glumes, membranous, lanceolate or ovate-lanceolate, 3-nerved, glabrous, entire, acute, acuminate or minutely awned; *callus* 0; *palea* shorter than lemmas, acute, 2-keeled, similar in texture to lemma. **Lodicules** 2, minute, delicate, glabrous. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose. **Caryopsis** ellipsoid to fusiform. $x = 10$ (7) (polyploidy).

Species 4, Africa; 3 in sthn Afr., widespread, not recorded from Western Cape.

Polevansia De Winter 9903101

(Chloridoideae—Cynodonteae—Chloridinae)

De Winter: 130 (1966); Clayton & Renvoize: 240 (1986); Gibbs Russell *et al.*: 274 (1990); Watson & Dallwitz: 763 (1994).

Perennial, rhizomatous and stoloniferous, decumbent, mat-forming, rooting at nodes. **Leaf blade** linear, expanded, tapering to an obtuse apex; sheaths chartaceous; *ligule* a fringed membrane, minutely fimbriate. **Inflorescence** rigid, oblong, of a number of short, dense, 1-sided, spike-like racemes, appressed, arranged alternately on central axis; rachis branches and pedicels triangular in cross section; *spikelets* solitary, pedicelled, lower glume adaxial to rachis. **Spikelet** 3.5–4.5 mm long, dorsiventrally compressed, disarticulating above glumes; *glumes* unequal, dissimilar, glabrous, awnless; lower glume lanceolate to narrowly ovate, subhyaline, nerveless, apex obtuse, truncate or emarginate; upper glume lanceolate, subcoriaceous, 1-nerved, slightly keeled towards apex, apex obtuse, as long as spikelet. **Floret** 1, bisexual; *lemma* subcoriaceous, narrowly lanceolate-oblong, entire, acute, not keeled, 3-nerved, lateral nerves hairy on lower half, very small mucro present, awnless; *callus* short, obtuse, shortly hairy; *palea* narrowly oblong-elliptic, 2-keeled, subhyaline, subcoriaceous, apex truncate, margins hairy on lower half. **Lodicules** 2, free, small, truncate. **Stamens** 3. **Ovary** oblong; styles distinct, plumose.

Species 1, sthn Afr.: *Polevansia rigida* De Winter, Lesotho to bordering Eastern Cape.

Polypogon Desf. 9902440

(Pooideae—Aveneae—Alopecurinae)

Desfontaines: 66 (1798); Chippindall: 96 (1955) under *Agrostis* L.; Hubbard: 98 (1970); Launert: 83 (1971); Tutin: 235 (1980); Clayton & Renvoize: 139 (1986); Gibbs Russell *et al.*: 274 (1990); Watson & Dallwitz: 765 (1994).

Annual or perennial. **Leaf blade** linear to linear-lanceolate, usually expanded; *ligule* an unfringed membrane. **Inflorescence** a densely contracted or spike-like, rarely open panicle; *spikelets* solitary, shortly pedicelled. **Spikelet** small, 1–4 mm long, ± laterally compressed, narrowly oblong to oblong, falling with glumes, and with pedicel or part of it; *glumes* ± equal, longer than spikelet, lanceolate, similar, membranous, 1-nerved, lightly keeled, hairy on keel, entire or shortly 2-lobed, awnless to awned; awn sometimes short and inconspicuous. **Floret** 1, bisexual; *lemma* less firm than glumes, hyaline, lanceolate or broadly oblong, rounded, glabrous, 5-nerved, truncate or 2-lobed, mucronate, awnless or awned, awned usually from near apex; *awn* very fine, shorter than to as long as lemma, sometimes inconspicuous, often deciduous; *palea* delicate, slightly to much shorter than lemma, acute, 2-keeled. **Lodicules** 2, delicate, membranous, glabrous. **Stamens** 3. **Ovary** glabrous; styles distinct, short, plumose. **Caryopsis** ellipsoid. $x = 7$ (10) (high polyploidy).

Species ± 18, tropics and warm temperate regions; ± 3 in sthn Afr., 1 endemic in Western and Eastern Cape, the rest widespread.

Prionanthium Desv. 9901800

(Arundinoideae—Arundineae)

Desvaux: 64 (1831); Stapf: 455 (1899); Chippindall: 270 (1955); Clayton & Renvoize: 170 (1986); Davidse: 149 (1988); Gibbs Russell *et al.*: 276 (1990); Watson & Dallwitz: 773 (1994).

Annual, tufted. **Leaf blade** tapering to a rounded apex; *ligule* a fringed membrane. **Inflorescence** a solitary, terminal, spike-like panicle, raceme or spike, sometimes inconspicuously 1-sided; *spikelets* solitary or paired, sometimes mixed on same inflorescence, sessile or subsessile or pedicelled, sometimes pairs unequally pedicelled. **Spikelet** laterally compressed, disarticulating above glumes and between florets; *glumes* ± equal, as long as spikelet, similar, coriaceous with broad membranous margins, ± boat-shaped, rounded at apex, slightly asymmetrical, keeled, keel usually with prominent stalked glands, 5–8-nerved, awnless. **Florets** 2, bisexual; *lemma* lanceolate to lanceolate-oblong, less firm than glumes, hyaline, 3–5-nerved, hairy or glabrous, awnless or mucronate; *palea* well developed, slightly shorter than lemma, narrow, sublinear, back and wings hyaline, 2-nerved, 2-keeled, keels prominent, thickened, hairy or glabrous. **Lodicules** 2, cuneate, glabrous, shallowly 1–3-lobed, minute, fleshy. **Stamens** 3. **Ovary** glabrous; styles free, stigmas plumose, laterally exserted. **Caryopsis** narrowly obovoid. $x = 7$.

Species 3, Western Cape, rare.

Prosphytochloa Schweick. 9901561

(Bambusoideae—Oryzeae)

Schweickerdt: 193 (1961); Stapf: 659 (1900) under *Potamophila* R.Br.; De Winter: 117 (1951) under *Potamophila* R.Br.; Chippindall: 33 (1955) under *Potamophila* R.Br.; Clayton & Renvoize: 73 (1986); Gibbs Russell *et al.*: 277 (1990); Watson & Dallwitz: 774 (1994).

Perennial, long-rhizomatous, climbing forest grasses with erect, scandent culms. **Leaf blade** heterophyllous (of 2 dissimilar kinds), margins scabrid with minute, short, retrorse barbs; lower leaves lanceolate, acuminate, expanded, ± flaccid, caudate; upper leaves filiform, longer than lower lanceolate type, tapering into a long filiform tip; *ligule* an unfringed membrane, usually truncate, eventually becoming laciniate. **Inflorescence** an open panicle, terminal on main culm and lateral branches; *spikelets* solitary, pedicelled. **Spikelet** slightly laterally compressed, broadly lanceolate, slightly twisted; *glumes* very reduced, ± equal, joined to form a small cup, awnless. **Florets** 3; *lower* 2 *florets* sterile; lemma subulate, variable in length, armed with minute hyaline spines; palea 0; *uppermost floret* bisexual; *lemma* acuminate, boat-shaped, coarsely covered with hyaline spines, entire, margins inflexed, 5-nerved, scarcely keeled, awnless; *callus* 0; *palea* acuminate, coriaceous, 3-nerved. **Lodicules** 2, broadly ovate, obtuse, fleshy, indistinctly nerved. **Stamens** 6. **Ovary** glabrous, subglobose; styles distinct, plumose. **Caryopsis** longitudinally grooved. $x = 12$.

Species 1, sthn Afr.: *Prosphytochloa prehensilis* (Nees) Schweick., Northern Province, Mpumalanga to KwaZulu-Natal and Eastern Cape.

Pseudechinolaena Stapf 9901010

(Panicoideae—Paniceae—Setariinae)

Stapf: 494 (1919); Chippindall: 364 (1955); Clayton & Renvoize: 545 (1982); Clayton & Renvoize: 270 (1986); Clayton: 3 (1989); Gibbs Russell *et al.*: 277 (1990); Watson & Dallwitz: 781 (1994).

Annual, decumbent; culms trailing. **Leaf blade** lanceolate, soft and thin, acute, pseudopetiolate, sometimes

cross-veined; *ligule* a thin, unfringed or fringed membrane. **Inflorescence** of 2–6 racemes, scattered on slender central axis, rachis narrow; *spikelets* paired or appearing solitary because one of the pair often very reduced, pedicelled. **Spikelet** laterally compressed, often gaping, ovoid, falling with glumes; *glumes* ± equal, dissimilar, herbaceous; lower glume three-quarters as long as spikelet, 3-nerved, glabrous, awnless; upper glume gibbous, as long as spikelet, 7-nerved, convex on keel, with longitudinal, translucent spots between nerves, few to many rigid hooks develop from spots (after fertilisation). **Florets** 2; *lower floret* male or sterile, lemma oblong-lanceolate, chartaceous, with membranous margins, glabrous, awnless; palea convolute, chartaceous; *upper floret* bisexual, *lemma* laterally compressed, similar to, to firmer in texture than glumes, chartaceous, ovate-lanceolate to oblong, entire, subacute, faintly 3–5-nerved, awnless; *palea* similar to lemma in texture, faintly 2-nerved, acute. **Lodicules** 2, cuneate, fleshy. **Stamens** 3. **Ovary** glabrous; styles free, plumose. **Caryopsis** obliquely ellipsoid, flattened on ventral side. $x = 9$ (polyploidy).

Species 6, 5 in Madagascar, 1 pantropical: *Pseudechinolaena polystachya* (Kunth) Stapf, Northern Province and KwaZulu-Natal to Eastern Cape.

Pseudopentameris Conert 9902081

(Arundinoideae—Arundineae)

Conert: 303 (1971); Stapf: 516 (1899) under *Danthonia* DC.; Chippindall: 241 (1955) under *Danthonia* DC.; Clayton & Renvoize: 174 (1986); Gibbs Russell *et al.*: 278 (1990); Watson & Dallwitz: 787 (1994); Barker: 141 (1995).

Perennial, tufted; culm erect, branched or simple. **Leaf blade** linear, rigid or soft, open and flat to rolled; sheaths appressed to culms; *ligule* a fringe of hairs. **Inflorescence** a panicle, somewhat contracted; *spikelets* pedicelled. **Spikelet** conspicuous, large, lanceolate, laterally compressed, disarticulating above glumes; *glumes* 15–60 mm long, ± equal, as long as to longer than spikelet, membranous, lanceolate, 3–5(7)-nerved, minutely scabrid, acuminate, awnless. **Florets** 2, bisexual; highly reduced third floret rarely present; *lemma* firmer in texture than glumes, chartaceous to cartilaginous, oblong, dorsally convex, variously hairy, 7–9-nerved, incised, 2-lobed, lobes with bristles or awns; awns not geniculate, *central awn* from between lobes very long, glabrous, scabrid, geniculate, twisted in lower part; *callus* elongated, slender, longer than lemma body, hairy; *palea* glabrous, narrowly lanceolate, apex bifid, 2-keeled, nerves prominent. **Lodicules** 2, glabrous or sparsely to densely ciliolate. **Stamens** 3. **Ovary** glabrous, with apical pseudostigmata; styles short or 0, plumose. **Caryopsis** surface reticulately sculptured. $x = 6$.

Species 4, sthn Afr., mountainous areas of Western Cape.

Puccinellia Parl. 9904150

(Pooideae—Poeae)

Parlatore: 366 (1848) name conserved; Stapf: 716 (1900) as *Atropis* Griseb.; Chippindall: 49 (1955); Launert: 158 (1970a); Hughes & Halliday: 167 (1980); Clayton & Renvoize: 99 (1986); Gibbs Russell *et al.*: 279 (1990); Watson & Dallwitz: 802 (1994).

Perennial, tufted. **Leaf blade** narrow, folded; *ligule* an unfringed membrane. **Inflorescence** a panicle, open or contracted, sometimes almost spike-like; *spikelets* solitary, shortly pedicelled. **Spikelet** 3–8 mm long, laterally compressed, disarticulating above glumes; *glumes* very unequal, shorter than spikelet, oblong, acute to obtuse, membranous, not keeled, awnless; lower glume 1-nerved; upper glume 3-nerved. **Florets** 2–12, bisexual; *uppermost floret* reduced, rachilla prolonged; *lemma* 2 or 3(4) mm long, similar in texture to glumes, membranous, lanceolate, oblong or ovate-oblong, tip scabrous, obtuse or blunt, often ragged, entire, rounded on back, 5-nerved, glabrous or sometimes hairy towards base, awnless; *callus* glabrous; *palea* subequalling lemma, lanceolate, 2-keeled, keels scaberulous to ciliate. **Lodicules** 2, ovate, hyaline. **Stamens** 3. **Ovary** glabrous; styles distinct, delicately plumose. $x = 7$ (high polyploidy).

Species ± 80, north temperate regions, mainly Asia; ± 4 in sthn Afr., Namibia, Free State, Northern and Western Cape.

Rendlia Chiov. 9902941

(Chloridoideae—Cynodonteae—Chloridinae)

Chiovenda: 53 (1914); Stapf: 637 (1900) under *Microchloa* R.Br.; Chippindall: 193 (1955); Pilger: 90 (1956); Renvoize: 329 (1974); Clayton & Renvoize: 241(1986) included in *Microchloa* R.Br.; Gibbs Russell *et al.*: 281 (1990); Watson & Dallwitz: 817 (1994).

Perennial, densely tufted, cushion-like. **Leaf blade** folded, narrow, blunt at apex, basal leaf sheaths densely woolly, splitting into fibres when old; *ligule* a fringed, usually firm, membrane. **Inflorescence** a solitary, rarely paired, terminal, 1-sided (secund) spike; rachis convex on back with membranous margins, spikelets densely packed and often at right angles to tough, narrow rachis; *spikelets* solitary, sessile. **Spikelet** disarticulating between glumes; *glumes* ± equal, longer than spikelet, dissimilar, 1-nerved, awnless; lower glume obliquely compressed, 1-keeled; upper glume dorsally compressed. **Florets** 2; *lower floret* bisexual; *upper floret* male or sterile; *lower lemma* similar in texture to glumes, keeled, 3-nerved, densely hairy on keel and margins, rarely glabrous, shortly 2-lobed, awnless; *palea* glabrous, 2-keeled, hyaline; upper lemma slightly shorter and glabrous, palea reduced or 0. **Lodicules** 2, sometimes 0. **Stamens** 3. **Ovary** obovoid; styles plumose. **Caryopsis** ellipsoid to broadly trigonous.

Species 1, Africa: *Rendlia altera* (Rendle) Chiov., high eastern regions of sthn Afr.

Rhytachne Desv. 9900340

(Panicoideae—Andropogoneae—Rottboelliinae)

Desvaux: 11 (1825); Stapf: 81 (1917); Chippindall: 519 (1955); Clayton & Renvoize: 843 (1982); Clayton & Renvoize: 364 (1986); Gibbs Russell *et al.*: 281 (1990); Watson & Dallwitz: 825 (1994).

Perennial, rarely annual, tufted. **Leaf blade** long, narrow, often setaceous; *ligule* a short, unfringed membrane. **Inflorescence** a solitary, terminal, rigid or flexuous, cylindrical raceme, raceme joints transverse; internodes clavate, as long as or longer than spikelets; *spikelets* in pairs, in long-short combinations: one sessile, the other pedicelled; pedicels free. **Sessile spikelet** dorsiventrally compressed, falling with glumes; *glumes* ± equal, awned or awnless (sometimes one or the other or both); lower glume coriaceous, rugose or strongly ribbed, 2-keeled or rounded on flanks, sharply inflexed on lower part, rarely winged; upper glume membranous or hyaline, with or without terminal bristle-like awn. **Florets** 2; *lower floret* male, rarely sterile; palea reduced; *upper floret* bisexual; *lemma* hyaline, awnless; *callus* truncate with central peg; *palea* hyaline, shorter than lemma. **Lodicules** 2, fleshy. **Stamens** 3. **Ovary** glabrous; styles short, plumose. **Caryopsis** oblong, dorsiventrally compressed.

Pedicelled spikelet male, sterile or much suppressed, often represented by a bristle or awn, up to 5 mm long, and a pedicel. $x = 10$.

Species 12, tropical and sthn Afr., Madagascar and tropical South America; 3 in sthn Afr., eastern Caprivi (Namibia), N KwaZulu-Natal and NE Eastern Cape.

Rottboellia L.f. 9900310

(Panicoideae—Andropogoneae—Rottboelliinae)

Linnaeus f.: 13, 114 (1782) name conserved, not of Scop.; Stapf: 72 (1917); Pilger: 266 (1954); Chippindall: 520 (1955); Clayton & Renvoize: 853 (1982); Clayton & Renvoize: 366 (1986); Gibbs Russell *et al.*: 283 (1990); Watson & Dallwitz: 829 (1994).

Annual, robust, tufted, erect, frequently with stilt roots from lower nodes. **Leaf blade** broad, flat, blade and sheath usually hairy with stiff conspicuous, often irritant, tubercle-based hairs; *ligule* a short, narrow, fringed membrane. **Inflorescence** a solitary cylindrical raceme, either terminal or aggregated into a spatheate false panicle, fragile; internodes squatly clavate, fused to adjacent pedicel; *spikelets* sunken, in pairs, in long-short combinations: one sessile, the other pedicelled but appearing sessile due to almost complete fusion of pedicel with rachis. **Sessile spikelet** dorsiventrally compressed, falling with glumes; *glumes* ± equal, dissimilar, awnless; lower glume coriaceous, flat-backed, smooth, 2-keeled, narrowly winged at apex, many-nerved. **Florets** 2; *lower floret* male; lemma with membranous incurved margins, awnless; palea well developed; *upper floret* bisexual; *lemma* less firm than glumes, ± hyaline, entire, glabrous, awnless; *callus* truncate with prominent peg; *palea* lanceolate, flattened dorsally, membranous. **Lodicules** 2, fleshy, glabrous. **Stamens** 3. **Ovary** ovoid, glabrous; styles 2, distinct, plumose. **Caryopsis** ovate in face view, crescentic in side view.

Pedicelled spikelet slightly smaller than sessile spikelet, male or sterile, falling separately, pedicel oblong, scarcely distinguishable from internode, compressed. $x = 9, 10$ (polyploidy).

Species 4, tropical and subtropical Africa and Asia; 1 in sthn Afr.: *Rottboellia cochinchinensis* (Lour.) Clayton, northern districts of Namibia, N Botswana, Northern Province, Mpumalanga and N KwaZulu-Natal.

Sacciolepis Nash 9901240

(Panicoideae—Paniceae—Setariinae)

Nash: 89 (1901); Stapf: 386 (1899); Stapf: 747 (1920); Chippindall: 356 (1955); Launert: 163 (1970b); Clayton & Renvoize: 454 (1982); Clayton & Renvoize: 277 (1986); Clayton: 41 (1989); Gibbs Russell *et al.*: 284 (1990); Watson & Dallwitz: 835 (1994).

Annual or perennial, tufted or decumbent, rhizomatous, mostly aquatic. **Leaf blade** expanded or rolled; *ligule* a narrow, fringed or unfringed membrane. **Inflorescence** a panicle, usually spike-like, dense and cylindrical, rarely open; *spikelets* pedicelled. **Spikelet** 1.3–4.5 mm long, almost spherical, laterally to dorsiventrally to not noticeably compressed, asymmetrical or gibbous; *glumes* very unequal, dissimilar, awnless, distinctly ribbed; lower glume shorter than spikelet, sometimes reduced to a small scale; upper glume as long as spikelet, usually gibbous or saccate at base, glabrous. **Florets** 2; *lower floret* male or sterile; lemma similar to upper glume but less gibbous, distinctly ribbed, glabrous, awnless, with or without a palea; *upper floret* bisexual; *lemma* firmer than glumes, entire, indurated, brittle, smooth, glossy, obscurely 3–5-nerved, margins inrolled and clasping edges of palea, awnless; *palea* similar to lemma. **Lodicules** 2, broadly cuneate. **Stamens** 3. **Ovary** ellipsoid, glabrous; styles distinct, plumose near ends. **Caryopsis** obliquely ellipsoid. $x = 9$ (polyploidy).

Species 30, tropics, mainly Africa; 8 in sthn Afr., N Namibia, Botswana, northern provinces of South Africa, Swaziland and KwaZulu-Natal to just into Eastern Cape.

Sartidia De Winter 9902622

(Arundinoideae—Aristideae)

De Winter: 137 (1963); De Winter: 381 (1965); Melderis: 95 (1971); Clayton & Renvoize: 185 (1986); Gibbs Russell *et al.*: 286 (1990); Watson & Dallwitz: 836 (1994).

Perennial, densely tufted, rhizomatous. **Leaf blade** often rolled, reddish brown when dry; *ligule* a dense fringe of hairs. **Inflorescence** a panicle, erect, narrow, usually interrupted, branches solitary or paired; *spikelets* solitary, pedicelled. **Spikelet** not noticeably compressed, disarticulating above glumes; *glumes* ± equal, narrow, acute to acuminate, flat to rounded on back, with or without apical awns, glabrous; lower glume usually 3-nerved; upper glume 3–5-nerved, nerves evanescent. **Floret** 1, bisexual; *lemma* firmer than glumes, coriaceous, subcylindrical, somewhat dorsiventrally compressed, slightly tapering upwards, grooved ventrally with involute margins, glabrous and smooth or scabrid, 3-nerved, without an articulation, 3-awned; *awns* glabrous or scabrid, spreading, collectively laxly spirally contorted at base when mature, column, when present, somewhat twisted; *callus* well developed, acute, obtuse or shallowly bifid, densely but shortly hairy; *palea* small, scale-like, not indurated, usually coriaceous below, 2-keeled, 2-nerved, apex obtuse. **Lodicules** 2, membranous, ± as long as palea, many-nerved. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose. **Caryopsis** dorsiventrally compressed, with deep ventral groove. $x = 11$.

Species 4, Africa and Madagascar; 3 in sthn Afr., N Namibia, Northern Province and Mpumalanga.

Schismus P.Beauv. 9904050

(Arundinoideae—Arundineae)

Palisot de Beauvois: 73 (1812); Stapf: 692 (1900); Chippindall: 240 (1955); Launert: 165 (1970a); Conert & Türpe: 1 (1974); Clayton & Renvoize: 176 (1986); Gibbs Russell *et al.*: 287 (1990); Watson & Dallwitz: 843 (1994).

Annual or perennial, tufted, stoloniferous. **Leaf blade** expanded or rolled, glabrous; *ligule* a fringe of hairs. **Inflorescence** a panicle, contracted or spike-like; *spikelets* solitary, shortly pedicelled. **Spikelet** 4–7 mm long, slightly laterally compressed, disarticulating above glumes or falling with glumes; *glumes* ± equal, shorter than to as long as spikelet, membranous, margins hyaline, 5–7-nerved, glabrous, awnless. **Florets** 4–10, bisexual; *upper floret* reduced; *lemma* 1.8–3.0 mm long, similar in texture to glumes, with hyaline margins, 7–9-nerved, glabrous or hairy on back or margins, hairs sometimes in tufts, 2-lobed or minutely notched (emarginate), awnless or mucronate or awned from between lobes; *awn* short, straight; *callus* short; *palea* ± equalling lemma, obovate, 2-keeled, 2-nerved, hyaline, glabrous or sometimes pilose. **Lodicules** 2, ciliate. **Stamens** 3. **Ovary** subglobose, glabrous; styles distinct, plumose above. **Caryopsis** ellipsoid. $x = 6$.

Species 5, Africa, Mediterranean region to northwest India; 4 in sthn Afr., Free State, Northern, Western and Eastern Cape.

Schizachyrium Nees 9900680

(Panicoideae—Andropogoneae—Andropogoninae)

Nees ab Esenbeck: 331 (1829); Stapf: 334 (1898); Stapf: 194 (1917); Chippindall: 502 (1955); Clayton & Renvoize: 754 (1982); Clayton & Renvoize: 352 (1986); Gibbs Russell *et al.*: 288 (1990); Watson & Dallwitz: 845 (1994).

Annual or perennial, tufted. **Leaf blade** linear, usually folded, midrib forming a keel, tip acute to obtuse; *ligule* a narrow, fringed membrane. **Inflorescence** sometimes solitary and terminal, usually in a spatheate false panicle with solitary, cylindrical, narrow racemes; internode and pedicels linear to clavate; *spikelets* paired, dissimilar, in long-short combination: one sessile, the other pedicelled. **Sessile spikelet** 2.5–9.0 mm long, dorsiventrally compressed or squeezed between internode and pedicel, falling with glumes and adjacent internode of

rachis; *glumes* ± equal, dissimilar, lower chartaceous to subcoriaceous, rounded or flattened on back, glabrous or hairy, 2-keeled or sharply inflexed (both sometimes together), keels lateral to frontal with several intercarinal nerves, mucronate or awnless; upper glume membranous, keeled at least upwards, rarely awned. **Florets** 2; *lower floret* reduced to a lemma, hyaline, awnless; *upper floret* bisexual; *lemma* less firm than glumes, rarely entire, incised, deeply or shallowly 2-lobed, rarely awnless, usually awned from sinus; *awn* glabrous, geniculate, usually short, sometimes inconspicuous; *callus* obtuse, short, hairy at base, inserted in crateriform and scariously rimmed top of internode; *palea* 0. **Lodicules** 2, minute. **Stamens** 2 or 3. **Ovary** glabrous; stigmas laterally exserted, plumose above. **Caryopsis** linear, subterete.

Pedicelled spikelet symmetrical, commonly smaller than sessile spikelet, male or sterile; lower glume sometimes awned; spikelet sometimes reduced to a glume. $x = 5, 10$ (polyploidy).

Species ± 60, throughout the tropics; 6 in sthn Afr., N Namibia, N Botswana, northern provinces of South Africa, Swaziland and KwaZulu-Natal.

Schmidtia Steud. ex J.A.Schmidt 9903610

(Chloridoideae—Pappophoreae)

Schmidt: 144 (1852) name conserved, not of Moench, not of Tratt.; Chippindall: 231 (1955); Launert: 308 (1965); Launert: 168 (1970a); Renvoize: 165 (1970); Launert: 149 (1971); Clayton & Renvoize: 189 (1986); Gibbs Russell *et al.*: 290 (1990); Watson & Dallwitz: 848 (1994).

Perennial or annual, tufted, sometimes decumbent at base, stoloniferous, sometimes rooting from nodes; culms decumbent, more rarely erect. **Leaf blade** and sheaths usually bearing gland-tipped hairs, often viscid; *ligule* a fringe of hairs. **Inflorescence** a panicle, open or contracted; *spikelets* solitary, shortly pedicelled to subsessile. **Spikelet** slightly laterally compressed, disarticulating above glumes; *glumes* unequal to ± equal, ± as long as spikelet, similar, membranous, green or grey, glabrous or hairy, hairs sometimes glandular, lanceolate, 7–11(14)-nerved, awnless. **Florets** 4–9, bisexual; *upper* 1 or 2 *florets* usually reduced and sterile; *lemma* dorsally rounded, firmer than glumes, 9-nerved, subcoriaceous, dorsally long-villous towards base, usually scabrid, 6-lobed, lobes alternating with 5 straight, scabrid *awns* from between lobes; *callus* minute, pointed, hairy; *palea* longer than lemma, oblong or elliptic-oblong, 2-keeled, with narrow flaps, stiffly ciliate along keels, cilia very often with interspersed glandular-tipped hairs. **Lodicules** 2, minute, cuneate, truncate or often with apex shallowly bilobed with gland-tipped hairs. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose. **Caryopsis** ellipsoid. $x = 9$ (polyploidy).

Species 2, Africa and Pakistan; 2 in sthn Afr., widespread.

Schoenefeldia Kunth 9902950

(Chloridoideae—Cynodonteae—Chloridinae)

Kunth: 86 (1829); Pilger: 95 (1956); Hubbard: 309 (1974); Clayton & Renvoize: 244 (1986); Gibbs Russell *et al.*: 291 (1990); Watson & Dallwitz: 850 (1994).

Perennial or annual, tufted, sometimes geniculate. **Leaf blade** narrowly linear; *ligule* reduced to a short, fringed membrane. **Inflorescence** of solitary, paired or digitate, slender, 1-sided spikes; *spikelets* solitary, sessile. **Spikelet** strongly laterally compressed, disarticulating above glumes; *glumes* very unequal, longer than spikelet, similar, membranous, 1-nerved, keeled, acute, mucronate or shortly awned. **Florets** 1 or 2; 1 bisexual; *uppermost floret* vestigial but awned; lowest *lemma* firmer than glumes, chartaceous or cartilaginous, shorter than glumes, ovate-elliptic, keeled, 3-nerved, hairy on nerves, incised, minutely 2-lobed, awned from between lobes; *awn* long, flexuous, entangled with awns of other spikelets in inflorescence; *callus* hairy; *palea* 2-nerved, 2-keeled. **Lodicules** 2. **Stamens** 3. **Ovary** glabrous; styles 2, plumose. **Caryopsis** (achene) narrowly ellipsoid, laterally compressed; pericarp free.

Species 2, Africa, Madagascar and India; 1 in sthn Afr.: *Schoenefeldia transiens* (Pilg.) Chiov., Mpumalanga.

Secale L. 9904390

(Pooideae—Triticeae)

Linnaeus: 84 (1753); Stapf: 764 (1900); Chippindall 70 (1955); Löve: 504 (1984); Clayton & Renvoize: 155 (1986); Hammer *et al.*: 135 (1987); Gibbs Russell *et al.*: 292 (1990); Watson & Dallwitz: 861 (1994).

Annual or perennial, tufted. **Leaf blade** linear, expanded or rolled, flaccid; *ligule* an unfringed membrane. **Inflorescence** a bristly single spike; *spikelets* solitary, sessile, distichously imbricate on main axis. **Spikelet** 10–15 mm long, laterally compressed, falling with glumes (not disarticulating in cultivated species); *glumes* narrow, unequal, ± as long as spikelet (excluding awns), strongly keeled, acuminate to awned, upper glume 1-nerved. **Florets** 2 or 3, bisexual or *uppermost floret* reduced and sterile; *lemma* oblong, lanceolate, glabrous, strongly keeled with single median keel on back, 5-nerved, nerves apically nonconfluent, awned; *awn* usually obvious, straight, glabrous; *palea* 2-keeled, bidentate, almost equalling lemma. **Lodicules** 2, hyaline, ciliate. **Stamens** 3. **Ovary** obovoid, hairy; styles distinct, plumose above. $x = 7$.

Species ± 5, Mediterranean, E Europe to central Asia; 1 in sthn Afr.: *Secale africanum* Stapf, 'Wild Rye', Western Cape (Roggeveld area).

Sehima Forssk. 9900130

(Panicoideae—Andropogoneae—Ischaeminae)

Forsskål: 178 (1775); Stapf: 35 (1917); Chippindall: 489 (1955); Clayton & Renvoize: 749 (1982); Clayton & Renvoize: 348 (1986); Gibbs Russell *et al.*: 292 (1990); Watson & Dallwitz: 862 (1994).

Annual or perennial, tufted. **Leaf blade** linear, expanded, glabrous; *ligule* a fringed membrane to a fringe of long hairs. **Inflorescence** a single, spike-like, terminal, cylindrical raceme, exserted from sheath; internodes stoutly linear to subclavate; rachis and pedicels hairy on either side with conspicuous woolly hairs; *spikelets* paired, secund, in long-short combinations: one sessile, the other pedicelled, pedicels free from rachis. **Sessile spikelet** 9–15 mm long, usually ± laterally compressed, disarticulating with glumes; *glumes* ± equal, dissimilar; lower glume coriaceous, deeply grooved or flat on back, 2-lobed or not lobed, 2-keeled, narrowly winged towards apex, mucronate; upper glume boat-shaped, keeled upwards, produced into a long, fine bristle-like awn. **Florets** 2; *lower floret* male; lemma hyaline, entire; palea well developed; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, hairy or glabrous, 2-lobed, awned from sinus; *awn* geniculate, much longer than body of lemma, glabrous or hairy; *callus* obtuse, inserted in concave top of internode; *palea* well developed, lanceolate, hyaline. **Lodicules** 2, fleshy, glabrous. **Stamens** 3. **Ovary** glabrous. **Caryopsis** lanceolate-oblong, dorsiventrally compressed.

Pedicelled spikelet strongly dorsiventrally compressed, flat; lower glume usually distinctly nerved, male or sterile; lemma awnless. $x = 10$ (17, 20).

Species 7, Africa, India and Australia; 2 in sthn Afr.: *Sehima galpinii* Stent from northern provinces of South Africa to N KwaZulu-Natal, and S. *ischaemoides* Forssk. in Grootfontein area of Namibia and in N Botswana.

Setaria P.Beauv. 9901280

(Panicoideae—Paniceae—Setariinae)

Palisot de Beauvois: 51 (1812) name conserved; Stapf: 419 (1899); Chippindall: 338 (1955); Launert: 170 (1970a); Clayton & Renvoize: 520 (1982); Clayton & Renvoize: 290 (1986); Clayton: 94 (1989); Gibbs Russell *et al.*: 293 (1990); Watson & Dallwitz: 867 (1994).

Cymbosetaria Schweick.: t. 3320 (1936); Chippindall: 355 (1955).

Annual or perennial, caespitose or decumbent, sometimes rhizomatous or stoloniferous. **Leaf blade** expanded or folded, rarely rolled, sometimes pleated longitudinally, occasionally saggitate; *ligule* a fringed membrane or fringe of hairs. **Inflorescence** a panicle, open or usually spike-like, then dense and cylindrical with branches reduced to stumps; *spikelets* solitary or clustered, shortly pedicelled or subsessile, each spikelet or cluster subtended by 1 to many bristles, these persist on axis after spikelet falls, bristles either shorter or longer than spikelet, scabrid, often coloured; spikelets when clustered usually not all fully developed. **Spikelet** elliptic to oblong to ovate, compressed dorsiventrally, falling with glumes (not disarticulating in cultivated forms); *glumes* unequal, membranous, awnless; lower glume up to half as long as spikelet, ovate from clasping base, 3–6-nerved; upper glume a third up to as long as spikelet, 3–9-nerved. **Florets** 2; *lower floret* male or sterile; lemma as long as spikelet, 5–7-nerved, rounded, flat, or longitudinally grooved dorsally, awnless; palea well developed or minute to 0; *upper floret* bisexual; *lemma* firmer than glumes, usually indurated, often finely or coarsely transversely rugose, more rarely smooth and glossy, glabrous, entire, margins inrolled and clasping only edges of palea, awnless; *palea* similar to lemma, relatively long. **Lodicules** 2, broadly cuneate. **Stamens** 3. **Ovary** ellipsoid, glabrous; styles distinct, plumose above. **Caryopsis** oblong or ellipsoid. $x = 9, 10$ (high polyploidy).

Species ± 110, tropics and subtropics; 18 in sthn Afr., widespread.

Sorghastrum Nash 9900461

(Panicoideae—Andropogoneae—Sorghinae)

Nash: 71 (1901); Chippindall: 463 (1955); Clayton & Renvoize: 731 (1982); Clayton & Renvoize: 341 (1986); Gibbs Russell *et al.*: 300 (1990); Watson & Dallwitz: 882 (1994).

Perennial, tufted, tall, sometimes shortly rhizomatous. **Leaf blade** linear; *ligule* an unfringed to a fringed membrane. **Inflorescence** a terminal panicle, narrow, loose to somewhat dense, branches filiform, primary branches appearing whorled, divided almost from base into flexuous peduncles bearing fragile racemes (sometimes these reduced to a single sessile spikelet), internodes and pedicels filiform, hairy, *spikelets* paired, appearing solitary since pedicelled spikelet usually reduced to a pedicel, pedicel free from rachis. **Sessile spikelet** dorsiventrally compressed, plump; *glumes* ± equal, dissimilar, awnless; lower glume dorsiventrally compressed, flat or rounded on back, truncate, keeled only on tip, 9-nerved, often hairy on back; upper glume broadly convex on back, glabrous, slightly keeled above, 5-nerved. **Florets** 2; *lower floret* sterile, reduced to a hyaline lemma, 2-keeled, margins inflexed, hairy, 2-nerved, awnless; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, almost reduced to awn, 2-lobed, awned from sinus of lobes; *awn* long; *callus* obtuse to pungent, usually not conspicuously hairy; *palea* delicate, hyaline, lanceolate. **Lodicules** 2, cuneate, fleshy, glabrous. **Stamens** 3. **Ovary** ellipsoid, glabrous; styles plumose. **Caryopsis** oblong.

Pedicelled spikelet reduced to a filiform, hairy, barren pedicel somewhat shorter than sessile spikelet, occasionally with a spikelet similar to a sessile spikelet on same inflorescence. $x = 10$ (polyploidy).

Species ± 20, mainly tropical and subtropical America and Africa; 2 in sthn Afr., N Namibia and N Botswana, northern provinces of South Africa to Swaziland and N KwaZulu-Natal.

Sorghum Moench 9900460

(Panicoideae—Andropogoneae—Sorghinae)

Moench: 207 (1794) name conserved; Stapf: 104 (1917); Stapf: 346 (1898); Snowden: 191 (1954); Chippindall: 457 (1955); De Wet: 477 (1978); Clayton & Renvoize: 726 (1982); Clayton & Renvoize: 339 (1986); Gibbs Russell *et al.*: 301 (1990); Watson & Dallwitz: 883 (1994).

Annual or perennial, tufted, sometimes rhizomatous, usually robust. **Leaf blade** expanded; *ligule* an unfringed to a fringed membrane or rarely a fringe of hairs. **Inflorescence** a large, terminal, open panicle (densely contracted in cultivated grain species), internodes and pedicels filiform; *spikelets* in pairs, terminally in triplets, in long-short combination: one sessile, the other pedicelled, pedicels free from rachis, dissimilar. **Sessile spikelet** dorsiventrally compressed, falling with glumes (not disarticulating in cultivated forms); *glumes* ± equal, dissimilar, awnless or upper glume rarely awned; lower glume dorsally compressed, usually leathery and glossy at maturity, flat or rounded on back, 2-keeled and narrowly winged near apex. **Florets** 2; *lower floret* sterile, reduced to a hyaline lemma, awnless; *upper floret* bisexual; *lemma* less firm than glumes, not becoming indurated, incised, usually 2-lobed, awnless or awned from between lobes; *awn* shorter to longer than body of lemma, geniculate, twisted, frequently short and straight in cultivars; *callus* obtuse, rarely pungent, hairy or glabrous; *palea* present or 0. **Lodicules** 2, fleshy, usually ciliate. **Stamens** 3. **Ovary** ellipsoid, glabrous; styles 2, terminal or subterminal, plumose. **Caryopsis** mostly obovoid, dorsiventrally compressed.

Pedicelled spikelet narrower than sessile spikelet, awnless, male or sterile, or reduced to a glume, awnless. $x = 5$ (aneuploids, high polyploidy).

Species ± 24, tropical and subtropical regions of the Old World; 3 in sthn Afr., widespread. Mostly introduced and extensively cultivated either for grain or fodder. *Sorghum versicolor* Andersson found in N Namibia, Botswana, the northern provinces of South Africa and KwaZulu-Natal, has apparently not played a role in the evolution of the cultivated sorghums.

Spartina Schreb. 9902930

(Chloridoideae—Cynodonteae—Chloridinae)

Schreber: 43 (1789); Stapf: 632 (1900); Chippindall: 208 (1955); Mobberly: 471 (1956); Launert: 176 (1970a); Clayton & Renvoize: 244 (1986); Gibbs Russell *et al.*: 302 (1990).

Perennial, tufted, rhizomatous or stoloniferous. **Leaf blade** flat or folded, rigid; *ligule* a minute fringe of hairs. **Inflorescence** of (1)2 or 3 long, 1-sided, persistent, spike-like racemes, subdigitate; rachis keeled on face, flattened dorsally, elongated at tip into a sharp point; *spikelets* solitary, subsessile, 2-ranked on rachis. **Spikelet** 12–15 mm long, strongly laterally compressed, falling entire at maturity; *glumes* very unequal, dissimilar, softly and shortly hairy, keeled, shortly awned or awnless; lower glume linear, acute or obtuse, 1-nerved; upper glume membranous or subcoriaceous, 3-nerved. **Floret** 1, bisexual; *lemma* oblong, membranous, keeled, minutely hairy upwards, 1-nerved, awnless; *palea* equalling lemma, 2-nerved, hyaline. **Lodicules** often 0.

Stamens 3. **Ovary** glabrous; styles long, connate at base, plumose above. **Caryopsis** fusiform. $x = 7, 10$ (high polyploidy).

Species ± 16, temperate America, coastal Europe and Africa; 1 in sthn Afr.: *Spartina maritima* (Curtis) Fernald, Namibia and shores of Western and Eastern Cape.

*Sphenopus Trin. 9903790

(Pooideae—Poeae)

Trinius: 135 (1820); Stace: 159 (1980); Clayton & Renvoize: 106 (1986); Gibbs Russell *et al.*: 303 (1990); Watson & Dallwitz: 893 (1994).

Annual, small, tufted, sometimes geniculate. **Leaf blade** expanded to rolled, almost filiform; *ligule* a long unfringed membrane. **Inflorescence** an open panicle, branches capillary and conspicuously divaricate; *spikelets* solitary, pedicelled; pedicel club-shaped at apex. **Spikelet** 2–3 mm long, laterally compressed; disarticulating above glumes and between florets; *glumes* very unequal, shorter than spikelet, awnless; lower glume minute or almost absent, nerveless; upper glume 1-nerved. **Florets** 2–7, bisexual; *lemma* similar in texture to glumes, membranous, obtuse to rounded, glabrous, 3-nerved, keeled on all 3 nerves, awnless; *callus* short, glabrous; *palea* bilobed, 2-keeled. **Lodicules** 2. **Stamens** 3, ovoid. **Ovary** glabrous; styles plumose. **Caryopsis** oblong-ellipsoid. $x = 6, 7$ (polyploidy).

Species 2, Mediterranean to Iran; 1 naturalised in sthn Afr.: **Sphenopus divaricatus* (Gouan) Rchb., W Northern Cape and Western Cape.

Sporobolus R.Br. 9902830

(Chloridoideae—Eragrostideae—Sporobolinae)

Brown: 169 (1810); Stapf: 578 (1900); Stent: 247 (1927b); Chippindall: 209 (1955); Launert: 176 (1970a); Clayton: 353 (1974); Clayton & Renvoize: 224 (1986); Gibbs Russell *et al.*: 304 (1990); Baaijens & Veldkamp: 393 (1991); Watson & Dallwitz: 897 (1994).

Annual or perennial, tufted, sometimes rhizomatous or stoloniferous or mat-forming. **Leaf blade** linear, flat, folded or rolled; *ligule* a short, inconspicuous, fringed membrane or a fringe of hairs. **Inflorescence** a panicle, open, ovoid or pyramidal, or contracted, sometimes spike-like; branches, especially lowermost, whorled or not; *spikelets* subsessile or pedicelled. **Spikelet** small, laterally to not noticeably compressed, disarticulating above glumes; *glumes* ± equal to unequal, shorter to longer than spikelet, 1-nerved, glabrous, keeled to keelless, awnless, upper glume not to slightly 1-keeled. **Floret** 1, bisexual, rarely rudiment of a second floret present; *lemma* similar to upper glume, similar in texture to glumes, membranous, often shining, 1–3-nerved, entire, glabrous, awnless, occasionally with a subulate tip; *palea* 2-nerved, often grooved between nerves. **Lodicules** 2, hyaline, truncate or 0. **Stamens** 2 or 3. **Ovary** often globose; styles free, plumose above. **Caryopsis** globose to ellipsoid, rounded or truncate, with a thin pericarp that swells and becomes detached from seed when wet, forcibly ejecting seed. $x = 9, 10$ (high polyploidy).

Species ± 160, tropical and warm temperate; 38 in sthn Afr., widespread.

Stenotaphrum Trin. 9901080

(Panicoideae—Paniceae—Setariinae)

Trinius: 175 (1820); Stapf: 438 (1899); Chippindall: 367 (1955); Sauer: 202 (1972); Clayton & Renvoize: 547 (1982); Clayton & Renvoize: 293 (1986); Clayton: 111 (1989); Gibbs Russell *et al.*: 314 (1990); Watson & Dallwitz: 901 (1994).

Annual or perennial, tufted, stoloniferous, usually creeping, rooting at nodes; culms and overlapping leaf sheaths usually compressed, abruptly contracted at base, often grouped in a fan-shaped arrangement; *ligule* a narrow, fringed membrane. **Inflorescence** mostly terminal, spike-like, secund, of several to many short racemes embedded in cavities in a thickened central axis, each raceme bearing up to 8 spikelets on a rachis that is usually produced beyond upper spikelet to a subulate tip; *spikelets* sessile to shortly pedicelled, falling entire at maturity or together with adjacent internode of central axis; lower glume abaxial. **Spikelet** dorsiventrally compressed, lanceolate or ovate, plump, awnless; *glumes* very unequal, dissimilar, membranous, awnless; lower glume generally shorter than spikelet, nerveless; upper glume similar to lower or ± as long as spikelet, 5–9-nerved. **Florets** 2; *lower floret* male or sterile; lemma chartaceous to coriaceous, acute or acuminate, 3–9-nerved; palea well developed; *upper floret* bisexual; *lemma* firmer than glumes, not becoming indurated, similar to lower but smaller, faintly 3–5-nerved, glabrous, entire, margins inrolled and covering palea but leaving tip free, awnless; *palea* usually indurated, 2-nerved. **Lodicules** 2. **Stamens** 3. **Ovary** glabrous; styles free, plumose above. **Caryopsis** lanceolate to oblong, plano-convex. $x = 9$ (polyploidy).

Species 7, tropics and subtropics; 2 in sthn Afr.: *Stenotaphrum secundatum* (Walt.) Kuntze mainly along coast from KwaZulu-Natal, Eastern Cape to Western Cape with records in eastern Caprivi (Namibia) and S Mpumalanga; *S. dimidiatum* (L.) Brongn. sporadic in N KwaZulu-Natal and Eastern Cape.

Stereochlaena Hack. 9900910

(Panicoideae—Paniceae—Digitariinae)

Hackel: 65 (1908); Chippindall: 425 (1955); Clayton & Renvoize: 655 (1982); Clayton & Renvoize: 298 (1986); Clayton: 128 (1989); Gibbs Russell *et al.*: 315 (1990); Watson & Dallwitz: 904 (1994).

Perennial, tufted, sometimes stoloniferous. **Leaf blade** expanded, usually hairy, margins thickened, white; *ligule* a narrow, fringed membrane. **Inflorescence** of slender, 1-sided, spike-like racemes, digitate, rachis triquetrous with narrow, fringed wings; *spikelets* paired, unequally pedicelled. **Spikelet** narrowly lanceolate, dorsiventrally compressed, falling with glumes; *glumes* unequal; lower glume absent; upper glume a minute scale. **Florets** 2; *lower floret* sterile; lemma flat on back with rounded sides, prominently 5–7-nerved, coarsely scabrid on nerves, awned from entire apex; awn straight, fine, 6–26 mm long; palea minute; *upper floret* bisexual; *lemma* firmer than glumes, papery, dark brown, margins thin, hyaline, enfolding and concealing palea, awnless; palea as long as lemma, dark brown. **Lodicules** 0. **Stamens** 3. **Ovary** glabrous, ovoid or ellipsoid; styles distinct, terminally exserted. **Caryopsis** narrowly ellipsoid, dorsally flattened.

Species 5, tropical East Africa to South Africa; 1 in sthn Afr.: *Stereochlaena cameronii* (Stapf) Pilg., Botswana, Northern Province and North-West.

Stiburus Stapf 9904000

(Chloridoideae—Eragrostideae—Eleusininae)

Stapf: 696 (1900); Stent: 301 (1924); Chippindall: 186 (1955); Pilger: 22 (1956); Phillips: 159 (1982); Clayton & Renvoize: 215 (1986) included in *Eragrostis* Wolf; Gibbs Russell *et al.*: 315 (1990); Watson & Dallwitz: 907 (1994).

Perennial, tufted, rhizomatous. **Leaf blade** setaceous, often overtopping inflorescence; *ligule* a short, fringed membrane or a fringe of hairs. **Inflorescence** a spike-like panicle, hairy; *spikelets* solitary, pedicelled. **Spikelet** laterally compressed, disarticulating above glumes and between florets; *glumes* unequal or ± equal, shorter than spikelet or upper glume longer than

spikelet, 1-nerved, acute to acuminate, densely hairy with tubercle-based hairs. **Florets** 2–6; *lower florets* bisexual; *uppermost floret* reduced; *lemma* similar to glumes, densely hairy with long hairs all over, 3-nerved, acute to acuminate, mucronate; *callus* minute, hairy; *palea* shorter than lemma, 2-keeled, membranous. **Lodicules** 2, minute, glabrous. **Ovary** glabrous; styles distinct, plumose above. $x = 10$.

Species 2, sthn Afr., northern provinces of South Africa, Swaziland, Free State, KwaZulu-Natal and Lesotho.

Stipa L. 9902630

(Pooideae—Stipeae)

Linnaeus: 78 (1753); Stapf: 571 (1899); De Winter: 212 (1965); Clayton: 114 (1970); Clayton & Renvoize: 83 (1986); Barkworth: 597 (1990); Gibbs Russell *et al.*: 316 (1990); Barkworth: 1 (1993); Watson & Dallwitz: 908 (1994).

Perennial or annual, tufted, rhizomatous. **Leaf blade** linear, expanded, folded or rolled; *ligule* an unfringed or fringed membrane. **Inflorescence** an open or contracted panicle, often linear or oblong; *spikelets* all alike, pedicelled. **Spikelet** 5–17 mm long, usually terete, laterally to not noticeably compressed, disarticulating above glumes, without rachilla extension; *glumes* ± equal to unequal, as long as to longer than spikelet, not gibbous, similar, awned or awnless, 1–7-nerved, equal to longer than spikelet. **Floret** 1; *lemma* firmer in texture than glumes, thickly membranous to coriaceous, becoming indurated, rounded on back, margins slightly overlapping, involute or open, entire or bilobed, 3–7-nerved, awned from sinus or apical, not off-centre; *awn* usually conspicuous, longer than body of lemma, extending beyond glumes, geniculate, column twisted, sometimes hairy; *callus* pungent or rarely obtuse, hairy; *palea* not keeled, 2-nerved, at least half as long as lemma. **Lodicules** 2 or 3, glabrous. **Stamens** 3. **Ovary** glabrous; stigmas rarely 3. **Caryopsis** fusiform. $x = 9, 10, 11, 12, 22$ (aneuploids, high polyploidy).

Species ± 300, tropical and temperate regions of both hemispheres; ± 5 (2 indigenous) in sthn Afr., northern provinces of South Africa, Free State, KwaZulu-Natal, Northern, Western and Eastern Cape.

Stipagrostis Nees 9902611

(Arundinoideae—Aristideae)

Nees ab Esenbeck: 290 (1832); Stapf: 551 (1899); Henrard: 1 (1926–1933) under *Aristida* L.; Henrard: 45 (1929–1933) under *Aristida* L.; Chippindall: 291 (1955) under *Aristida* L.; Pilger: 123 (1956); De Winter: 307 (1965); Clayton: 137 (1970); Launert: 187 (1970a); Melderis: 131 (1971); Clayton & Renvoize: 185 (1986); Gibbs Russell *et al.*: 318 (1990); Watson & Dallwitz: 910 (1994).

Perennial (sometimes short-lived) or annual, densely tufted, sometimes shrubs or dwarf shrubs, erect to geniculate, often with a well developed knotty rhizomatous base. **Leaf blade** usually long and narrow; *ligule* a dense fringe of hairs. **Inflorescence** a narrow or open panicle, sometimes spike-like, often interrupted; *spikelets* solitary or in fascicles, pedicelled. **Spikelet** disarticulating above glumes; *glumes* ± equal or unequal, narrow, as long as to longer than spikelet, 3–11-nerved, glabrous or hairy, obtuse to acuminate, awnless; lower glume usually 3-nerved. **Floret** 1, bisexual; *lemma* narrow, cylindrical, firmer than glumes, ventrally grooved or margins involute, indurated at maturity, 3-awned, appearing as 1 awn with 3 branches due to fusion, rarely solitary as laterals reduced; *awns* with or without a column, all, or only central awn plumose or with a pencil of hairs at apex of column, articulation present at or above middle of lemma or between base of column and body of lemma, or 0; *callus* well developed, pungent or minutely bifid, usually oblique, bearded or glabrous; *palea* usually much less than half as long as lemma, indurated, 2-nerved, glabrous. **Lodicules** usually 2, or 0, obtuse. **Stamens** 3. **Ovary** glabrous; styles free, plumose above. $x = 11$ (polyploidy).

Species ± 50, Africa, NW India and SW Asia; 29 in sthn Afr., widespread.

Streblochaete Pilg. 9901971

(Pooideae—Meliceae)

Pilger: 61 (1906); Chippindall: 82 (1955); Hubbard: 74 (1970); Launert: 66 (1971); Clayton & Renvoize: 115 (1986); Gibbs Russell *et al.*: 329 (1990); Watson & Dallwitz: 912 (1994).

Perennial, tufted. **Leaf blade** linear-lanceolate, flaccid, rolled; *ligule* a short, unfringed membrane. **Inflorescence** an open panicle, ± 1-sided, branches filiform, drooping, mostly solitary or paired and rather far apart on central axis; *spikelets* pedicelled. **Spikelet** not noticeably compressed, disarticulating above glumes; *glumes* unequal, shorter than spikelet, similar, membranous, margins hyaline, rounded on back, apex subacute to acute, awnless; lower glume 3-nerved; upper glume 5-nerved, often with transverse nerves. **Florets** 2–6, loosely arranged, *lower* 2–4 *florets* usually bisexual; *uppermost floret* male, sterile or greatly reduced; lower *lemmas* lanceolate to narrowly elliptic, similar to firmer in texture to glumes, becoming indurated (chartaceous) at maturity, rounded on back, distinctly 7-nerved, shortly 2-lobed, rarely entire, awned from back beneath sinus of lobes; *awn* geniculate, up to 3 times longer than body of lemma, flexuous, scaberulous, intertwined with awns from other florets so that spikelet falls as an unit; *callus* long, pointed, hairy; *palea* shorter than lemma, 2-keeled, linear. **Lodicules** 2, minute, cuneate-truncate, glabrous or ciliate. **Stamens** 3. **Ovary** glabrous, oblong; styles distinct, plumose above. $x = 10$.

Species 1, tropical Africa, Réunion, Indonesia, Philippines; *Streblochaete longiarista* (A. Rich.) Pilg., Eastern Cape.

Styppeiochloa De Winter 9903504

(Arundinoideae—Arundineae)

De Winter: 134 (1966); Phillips: 123 (1951) under *Crinipes* Hochst.; Chippindall: 123 (1955) under *Crinipes* Hochst.; Clayton & Renvoize: 172 (1986); Gibbs Russell *et al.*: 330 (1990); Watson & Dallwitz: 918 (1994).

Perennial, dense, sclerophyllous tufts, with hard, fibrous basal sheaths, forming thick, dense, fire-resistant mats. **Leaf blade** rolled, setaceous; *ligule* a fringe of hairs. **Inflorescence** a scanty, contracted panicle; spikelets appressed to branches; *spikelets* pedicelled. **Spikelet** laterally compressed, disarticulating above glumes; *glumes* unequal, shorter than spikelet, lanceolate, apex 3-lobed or entire, with short awn-point; lower glume 1-nerved; upper glume 1–3-nerved. **Florets** 2–5, bisexual; *uppermost floret* sterile or reduced to a lemma; *lemma* lanceolate, similar in texture to glumes, 3–5(7)-nerved, hairy on margins near base, lateral nerves glabrous or minutely hairy, incised, 3-lobed, lobes with awns or mucros, central *awn* straight, shorter than body of lemma; *callus* short and hairy; *palea* narrowly lanceolate, subequalling lemma. **Lodicules** 2, small, truncate, glabrous. **Stamens** 3. **Ovary** elliptic-oblong, glabrous; style bases knob-like. **Caryopsis** fusiform.

Species 2, mountainous areas of south and southeast tropical Africa; 1 in sthn Afr.: *Styppeiochloa gynoglossa* (Gooss.) De Winter, Mpumalanga, Swaziland, Free State, KwaZulu-Natal and into Eastern Cape.

Tarigidia Stent 9900891

(Panicoideae—Paniceae—Digitariinae)

Stent: 151 (1932); Chippindall: 422 (1955); Clayton & Renvoize: 300 (1986); Gibbs Russell *et al.*: 331 (1990); Watson & Dallwitz: 927 (1994).

Perennial, tufted, glaucous. **Leaf blade** linear, long, flat; *ligule* an unfringed membrane. **Inflorescence** a spike-like, cylindrical, contracted panicle, rarely with lower branches shortly produced, hairy; *spikelets* shortly pedicelled, clustered, or usually in pairs on lower branches. **Spikelet** 4.0–4.5 mm long, dorsiventrally compressed, narrowly elliptic, subacute to acute, falling with glumes; *glumes* ± equal, ± two-thirds length of spikelet, acuminate, awnless; lower glume 1-nerved, hairy or glabrous except near margins; upper glume 3-nerved, hairy. **Florets** 2; *lower floret* reduced to a lemma, 5–7-nerved, hairy with long, spreading hairs between nerves and near margins; *upper floret* bisexual, *lemma* ± as long as lower lemma, similar in texture to glumes, chartaceous, glabrous, without median keel, rounded on back, at least at base, margins lying flat and exposed on palea, awnless; *palea* equalling lemma, chartaceous, 2-nerved. **Lodicules** minute, cuneate. **Stamens** 3. **Ovary** glabrous; styles connate at base, plumose.

Species 1, sthn Afr.: *Tarigidia aequiglumis* (Gooss.) Stent, sporadic in Namibia, North-West and Free State.

Tetrachne Nees 9903270

(Chloridoideae—Eragrostideae—Uniolinae)

Nees ab Esenbeck: 375 (1841); Stapf: 709 (1900); Chippindall: 188 (1955); Clayton & Renvoize: 201 (1986); Gibbs Russell *et al.*: 331 (1990); Watson & Dallwitz: 931 (1994).

Perennial, densely tufted, rhizomatous. **Leaf blade** rolling early, glabrous except at sheath-mouth; *ligule* a dense fringe of hairs. **Inflorescence** of few to many dense, secund spikes mostly scattered on a central axis, usually appressed to axis. **Spikelet** laterally compressed, falling with glumes, not disarticulating between florets; *glumes* ± equal, shorter than spikelet, glabrous, keels winged, 1-nerved, awnless. **Florets** 5 or 6, *lowest* 2 *florets* reduced to lemmas; *uppermost floret* reduced; the rest bisexual; sterile lemma similar to glumes; *bisexual lemma* 5-nerved, entire, keeled, hairy on keel, slightly winged, awnless; *palea* equalling or subequalling lemma, 2-keeled, keels winged. **Lodicules** 2, small, cuneate, glabrous. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose above. $x = 10$.

Species 1, sthn Afr. and Pakistan; *Tetrachne dregei* Nees, Free State, Lesotho and mountains of Eastern Cape.

Tetrapogon Desf. 9903220

(Chloridoideae—Cynodonteae—Chloridinae)

Desfontaines: 388 (1799); Chippindall: 198 (1955); Pilger: 100 (1956); Launert: 202 (1970a); Renvoize: 347 (1974); Clayton & Renvoize: 236 (1986); Gibbs Russell *et al.*: 332 (1990); Watson & Dallwitz: 933 (1994).

Annual or perennial (often short-lived), tufted. **Leaf blade** linear, flat or folded, tapering, acute; *ligule* a narrow, fringed membrane. **Inflorescence** terminal, solitary (rarely paired), dense, 1-sided spike, often ciliate or villous; *spikelets* solitary or paired, subsessile, alternate in 2 rows on a tough rachis. **Spikelet** cuneate, laterally compressed, disarticulating above glumes, not between florets; *glumes* ± equal, nearly to as long as spikelet, similar, membranous, glabrous, 1-nerved, acute, acuminate, awnless or awn-tipped from near apex; upper glume ± equal to spikelet (excluding awns). **Florets** 4–7, *lower florets* bisexual, *upper florets* sterile and reduced to clavate lemmas; sterile lemma glabrous to rarely hairy, awnless; fertile *lemma* firmer in texture than glumes, coriaceous, keeled, 3–5-nerved, usually hairy on lateral nerves and keel, entire or 2-lobed, with a subterminal central awn; *awn* 3–11 mm long, straight; *callus* acute, hairy; *palea* ciliolate on keels. **Lodicules** 2, ± oblong, glabrous. **Stamens** 3. **Ovary** oblong, glabrous; styles distinct, plumose above. **Caryopsis** (achene) oblong; pericarp loose. $x = 10$.

Species 5, Middle East, India and Africa; 1 in sthn Afr.: *Tetrapogon tenellus* (Roxb.) Chiov., N Namibia, Mpumalanga and Northern Province.

Thamnocalamus Munro 9904570

(Bambusoideae—Bambuseae—Arundiniinae)

Munro: 33 (1868); Soderstrom & Ellis: 53 (1982); Clayton & Renvoize: 43 (1986); Gibbs Russell *et al.*: 333 (1990); Watson & Dallwitz: 935 (1994).

Perennial, woody, tree-like, tufted, rhizomatous; rhizomes sympodial; culms hollow. **Culm leaves**, including blades, ± persistent. **Foliage leaf blade** expanded, strongly cross-veined forming a tessellate pattern, pseudopetiolate; *ligule* a fringed membrane. **Inflorescence** compound, of several racemes, each of 3–5 spikelets subtended by a bract, these gathered into a fascicle and partly enveloped by a spathe; lowermost spikelet sessile. **Spikelet** ovoid, not noticeably compressed; *glumes* ± equal; lower glume shorter than upper, acute; upper glume pointed. **Florets** 1–several, bisexual; *lemma* 10–11-nerved, awnless or awned; *palea* with several nerves. **Lodicules** 3, membranous, ciliate. **Stamens** 3. **Ovary** glabrous; stigmas 3. $x = 12$.

Species ± 6, E Asia, Africa; 1 in sthn Afr.: *Thamnocalamus tessellatus* (Nees) Soderstrom & R.P.Ellis, Free State, KwaZulu-Natal, Lesotho and Eastern Cape.

Thelepogon Roth ex Roem. & Schult. 9900110

(Panicoideae—Andropogoneae—Ischaeminae)

Roemer & Schultes: 46 (1817); Clayton & Renvoize: 744 (1982); Clayton & Renvoize: 346 (1986); Gibbs Russell *et al.*: 334 (1990); Watson & Dallwitz: 938 (1994).

Annual, coarse, often with prop roots. **Leaf blade** lanceolate, base amplexicaul, expanded; *ligule* an unfringed or fringed membrane. **Inflorescence** terminal, with many racemes, digitate or subdigitate, internodes thickened and clavate, disarticulating transversely; *spikelets* in pairs, in long-short combination: one sessile, the other pedicelled; pedicelled spikelet reduced or represented by pedicel only. **Sessile spikelet** dorsiventrally compressed, falling with glumes, rachis joint and pedicel; *glumes* ± equal, longer than spikelet, glabrous, awnless, dissimilar; lower glume crustaceous, rugose, without keels or wings, rounded on flanks; upper glume rugose, wingless. **Florets** 2; *lower floret* male; lemma hyaline; palea well developed; *upper floret* bisexual; *lemma* less firm than glumes, 2-lobed, awned between lobes; *awn* glabrous, much longer than body of lemma; *callus* obtuse, hairy, fitting into concave top of internode; *palea* present. **Lodicules** 2, fleshy, glabrous. **Stamens** 3. **Ovary** glabrous. **Caryopsis** ellipsoid.

Pedicelled spikelet reduced or represented by flattened, linear pedicel. $x = 5$.

Species 1, tropical Africa extending eastwards to Indonesia: *Thelepogon elegans* Roem. & Schult., Namibia (Caprivi).

Themeda Forssk. 9900830

(Panicoideae—Andropogoneae—Anthistiriinae)

Forsskål: 178 (1775); Stapf: 366 (1898); Stapf: 415 (1919); Chippindall: 490 (1955); Clayton & Renvoize: 829 (1982); Clayton & Renvoize: 360 (1986); Gibbs Russell *et al.*: 334 (1990); Watson & Dallwitz: 940 (1994).

Annual or perennial, tufted. **Leaf blade** linear, flat or folded; lower leaf sheaths often compressed and keeled; *ligule* a fringed to unfringed membrane, truncate. **Inflorescence** of solitary racemes embraced by sheathing spatheoles, these single or in dense branches on flexuous peduncles and gathered into a leafy false panicle; racemes very short, composed of a single, awned sessile spikelet and 2 pedicelled spikelets, the whole enclosed by an involucre of 4 sterile spikelets; internodes and pedicels linear, homogamous spikelets all sessile. **Sessile spikelet** ± terete, usually deciduous; *glumes* ± equal, coriaceous except at apices, awnless; lower glume obtuse, usually not grooved. **Florets** 2; *lower floret* sterile, reduced to a hyaline lemma, nerveless, awnless; *upper floret* bisexual; *lemma* stipitiform, passing directly into a stout geniculate *awn*; *callus* obtuse to pungent, hairy; *palea* minute or 0. **Lodicules** 2, fleshy, glabrous. **Stamens** 3. **Ovary** glabrous. **Caryopsis** lanceolate, channelled on one side.

Pedicelled spikelet narrowly lanceolate, male or sterile, awnless; callus long and slender, as long as or longer than pedicel which is often reduced to a stump. $x = 5, 10$ (aneuploids, high polyploidy).

Species 18, tropical and subtropical regions of Old World, but mainly in Asia; 1 in sthn Afr.: *Themeda triandra* Forssk., widespread and very variable.

Thinopyrum Á.Löve 9904348

(Pooideae—Triticeae)

Löve: 351 (1980); Chippindall: 69 (1955) under *Agropyron* Gaertn.; Löve: 475 (1984); Clayton & Renvoize: 150 (1986) included in *Elymus* L.; Gibbs Russell *et al.*: 336 (1990); Watson & Dallwitz: 942 (1994).

Perennial, erect and rigid or creeping and rooting at nodes, stoloniferous. **Leaf blade** linear, expanded or rolled, rigid; *ligule* an unfringed membrane. **Inflorescence** a single true spike; *spikelets* solitary, sessile to subsessile, appressed to rachis, rachis disarticulating and spikelets falling with internode below. **Spikelet** (15)28–40 mm long, laterally compressed, falling with glumes; *glumes* ± equal, shorter than spikelet, similar, many-nerved, awnless. **Florets** 5–11, bisexual, *uppermost floret* reduced; *lemma* similar in texture to glumes, glabrous, 5-nerved, usually 3-toothed, awned, *awn* minute, straight; *palea* present, keels winged. **Lodicules** 2, membranous, ciliate. **Stamens** 3. **Ovary** hairy. $x = 7$ (polyploidy).

Species ± 5, coasts of Europe; 1 in sthn Afr.: *Thinopyrum distichum* (Thunb.) A.Löve, Western and Eastern Cape.

Trachypogon Nees 9900780

(Panicoideae—Andropogoneae—Germainiinae)

Nees ab Esenbeck: 341 (1829); Stapf: 331 (1898); Chippindall: 494 (1955); Clayton & Renvoize: 707 (1982); Clayton & Renvoize: 338 (1986); Gibbs Russell *et al.*: 336 (1990); Watson & Dallwitz: 955 (1994).

Perennial, densely tufted, sometimes with shortly creeping rhizomes; culm bearded at nodes with ring of white appressed hairs. **Leaf blade** narrowly linear, rolled or expanded; *ligule* an unfringed membrane. **Inflorescence** a terminal, cylindrical, spike-like, solitary raceme, rarely digitate, internodes slender, semiterete to linear, very obliquely articulated below spikelets; *spikelets* paired, in long-short combinations, unequally pedicelled, one subsessile, the other pedicelled, dissimilar. **Subsessile spikelet** persistent, flattened dorsally or somewhat terete, awnless, usually male or sterile, otherwise resembling pedicelled spikelet; callus 0.

Long-pedicelled spikelet falling separately, not noticeably compressed, somewhat terete; *glumes* ± equal, dissimilar, awnless; lower glume firmly chartaceous to coriaceous, glabrous to hairy, finely 2-keeled upwards, margins inflexed, very narrow, obscurely nerved; upper glume thinner, grooved on either side of rounded keel. **Florets** 2, *lower floret* sterile, reduced to a lemma, hyaline, 2-nerved, ciliate or ciliolate upwards, awnless; *upper floret* bisexual; *lemma* stipitiform, less firm than glumes (hyaline at base), passing into a flexuous or geniculate, hairy *awn*; *callus* pungent to acute, densely hairy, obliquely attached to pedicel; *palea* minute, hyaline or 0. **Lodicules** 2, small, glabrous. **Stamens** 3. **Ovary** glabrous; styles terminal, plumose. **Caryopsis** terete. $x = 5, 10$ (polyploidy).

Species ± 3–13, Africa, Madagascar and tropical America; 1 in sthn Afr.: *Trachypogon spicatus* (L.f.) Kuntze, widespread, not in very dry areas.

Tragus Haller 9902740

(Chloridoideae—Cynodonteae—Zoysiinae)

Haller: 203 (1768) name conserved; Schweickerdt: 15 (1941); Chippindall: 105 (1955); Launert: 205 (1970a); Clayton: 399 (1974); Clayton & Renvoize: 253 (1986); Gibbs Russell *et al.*: 337 (1990); Watson & Dallwitz: 957 (1994).

Annual or perennial, tufted, sometimes decumbent, rhizomatous and stoloniferous, often creeping. **Leaf blade** expanded, pectinate-ciliate on margins; *ligule* a short, fringed membrane or a fringe of hairs. **Inflorescence** stiff, dense, cylindrical, spike-like; *spikelets* in subsessile deciduous clusters, each cluster composed of 2–5 spikelets on a reduced peduncle, sometimes peduncles long; spikelets of a cluster all alike or upper ± reduced. **Spikelet** dorsiventrally compressed, lanceolate to ovate, falling in clusters with glumes; *glumes* unequal, dissimilar, awnless; lower glume a minute scale or suppressed; upper glume as long as spikelet, 5–7-nerved, nerves formed into prominent ribs bearing hooked, curved or straight prickles. **Floret** 1, bisexual; *lemma* almost as long as upper glume, membranous, entire, 3-nerved, awnless; *palea* as long as lemma, 2-nerved. **Lodicules** 2, broad, cuneate. **Stamens** 3. **Ovary** glabrous; styles distinct, plumose above. **Caryopsis** ellipsoid to oblong, slightly dorsiventrally compressed. $x = 10$ (polyploidy).

Species 7, throughout tropics but mainly Africa; 4 in sthn Afr., widespread in disturbed areas.

Tribolium Desv. 9904021

(Arundinoideae—Arundineae)

Desvaux: 64 (1831); Renvoize: 795 (1985); Clayton & Renvoize: 169 (1986); Gibbs Russell *et al.*: 339 (1990); Watson & Dallwitz: 959 (1994); Linder & Davidse: 445 (1997).

Lasiochloa Kunth: 556 (1832); Chippindall: 116 (1955). *Plagiochloa* Adamson & Sprague: 89 (1941); Chippindall: 113 (1955). *Urochlaena* Nees ab Esenbeck: 437 (1841); Stapf: 700 (1900); Chippindall: 117 (1955); Clayton & Renvoize: 170 (1986); Gibbs Russell *et al.*: 350 (1990).

Annual or perennial, tufted, decumbent to mat-forming, stoloniferous or not. **Leaf blade** expanded or rolled; *ligule* a fringed membrane to a fringe of hairs. **Inflorescence** a panicle or single spike or raceme, contracted or capitate, rarely partially enclosed by a much enlarged flag leaf and disarticulating below flag leaf and falling as a unit, secund or spikelets 2-ranked; *spikelets* solitary.

Spikelet 1.5–10 mm long, laterally to not noticeably compressed, usually disarticulating above glumes and tardily between florets; *glumes* ± equal to unequal, shorter to longer than spikelet, similar, acute to acuminate, 3–7-nerved, glabrous or sometimes with tubercle-based glassy hairs, awnless, rarely awned. **Florets** 2–5(–10), bisexual; *uppermost floret* sometimes reduced; *lemma* less firm to similar in texture to glumes, entire, without lobes (rarely emarginate with minutely awned lobes), acute to long-acuminate, 5–9-nerved, with hairs acute or club-shaped in marginal rows or fringes, or variously scattered; awnless, rarely with a slender, straight *awn*; *callus* short, glabrous; *palea* elliptic, linear or obovate, acute, rounded or sometimes truncate or bilobed, with tufts of long hairs on margins. **Lodicules** 2, obtriangular. **Stamens** 3. **Ovary** glabrous. **Caryopsis** ellipsoid or obovoid. $x = 6$.

Species ± 10, sthn Afr., S Namibia, western regions of Northern, Western and Eastern Cape.

Tricholaena Schrad. in Schult. 99901330

(Panicoideae—Paniceae—Melinidinae)

Schultes: 8, 163 (1824); Stapf: 441 (1899); Chippindall: 434 (1955); Launert: 206 (1970a); Clayton & Renvoize: 502 (1982); Clayton & Renvoize: 295 (1986); Zizka: 36 (1988); Zizka: 113 (1989); Gibbs Russell *et al.*: 341 (1990); Watson & Dallwitz: 960 (1994).

Perennial or rarely annual, tufted; culm usually branched from lower nodes, often geniculate. **Leaf blade** expanded or frequently involute; *ligule* a narrow, fringed membrane or a fringe of hairs. **Inflorescence** a panicle, open, diffuse, usually much divided; *spikelets* pedicelled. **Spikelet** symmetrically oblong in profile, laterally compressed; *glumes* unequal, very dissimilar, with distinct, elongated internode between glumes, awnless, rarely minutely mucronate; lower glume usually a minute, ovate scale, rarely well developed, 0–1-nerved; upper glume as long as spikelet, narrower than lower lemma, usually slightly notched at apex, 3–5-nerved. **Florets** 2; *lower floret* male; lemma similar to upper glume but wider and slightly longer, finely 3–7-nerved; *upper floret* bisexual; *lemma* firmer than glumes, smaller than lower lemma, dorsally compressed, glabrous, smooth, glossy, brittle, white, readily deciduous, margins flat and partly clasping palea, awnless; *palea* subequalling lemma, hyaline, 2-nerved. **Lodicules** 2. **Stamens** 3. **Ovary** ellipsoid; styles free or connate at base, plumose above. **Caryopsis** ovoid to elliptic-oblong. $x = 9$ (polyploidy).

Species 4, mainly Africa, also from the Canaries, Mediterranean and Madagascar; 2 in sthn Afr., widespread, not recorded from Lesotho, Western and Eastern Cape.

Trichoneura Andersson 9903530

(Chloridoideae—Eragrostideae—Eleusininae)

Andersson: 148 (1855); Stapf: 649 (1900); Chippindall: 128 (1955); Launert: 209 (1970a); Phillips: 296 (1974); Clayton & Renvoize: 214 (1986); Gibbs Russell *et al.*: 342 (1990); Watson & Dallwitz: 962 (1994).

Annual or perennial, tufted. **Leaf blade** linear, usually expanded, pointed; *ligule* an unfringed membrane, truncate. **Inflorescence** open or contracted, composed of a number of racemes scattered along a central axis; racemes often stiff and straight, sometimes spreading; *spikelets* solitary, subsessile, biseriate, overlapping or distant. **Spikelet** 3–14 mm long, laterally compressed, wedge-shaped, disarticulating above glumes and between florets; *glumes* ± equal, equal to longer than spikelet, similar, membranous, very narrow, 1-nerved, tapering to a mucro or awn; lower glume longer than lowest lemma. **Florets** 3–many, *lower floret* bisexual; *upper floret* reduced; *lemma* similar in texture to glumes, membranous, rounded on back, 3-nerved, hairy, conspicuously ciliate along lateral nerves, incised, bluntly 2-lobed, awned from sinus; *awn* fine, bristle-like, shorter than body of lemma, straight; *palea* ± equalling lemma, often pilose between keels. **Lodicules** 2, fleshy, glabrous. **Stamens** 3. **Ovary** obovoid, glabrous; styles distinct, plumose above. **Caryopsis** narrow, dorsally flattened. $x = 10$.

Species 7, Africa, Arabian Peninsula, Texas, United States of America; ± 2 in sthn Afr., widespread, not in Western Cape.

Trichopteryx Nees 9901750

(Panicoideae—Arundinelleae)

Nees ab Esenbeck: 449 (1836) as *Trichopteria*; Nees ab Esenbeck: 339 (1841); Stapf: 449 (1899); Chippindall: 287 (1955); Conert: 238 (1957); Phipps: 119 (1964); Clayton: 409 (1974); Clayton & Renvoize: 319 (1986); Clayton: 213 (1989); Gibbs Russell *et al.*: 344 (1990); Watson & Dallwitz: 963 (1994).

Annual or perennial, erect or trailing; culm often wiry. **Leaf blade** linear-lanceolate, expanded, crinkled on one margin, reflexed; *ligule* a fringe of hairs. **Inflorescence** a panicle, usually fairly dense, pedicels commonly setose; *spikelets* solitary or in pairs. **Spikelet** brown, laterally to not noticeably compressed, disarticulating above glumes and between florets; *glumes* unequal, similar, narrowly ovate, membranous, ± persistent, 3-nerved; lower glume half as long as spikelet; upper glume as long as spikelet. **Florets** 2; *lower floret* male or sterile; lemma 3-nerved, not keeled, awnless; *upper floret* bisexual; *lemma* similar to firmer in texture than glumes, membranous to thinly coriaceous, 5–7-nerved, incised, 2-lobed, lobes finely awned, hairy, a conspicuous tuft of white hairs below each lobe, awned from sinus between lobes; *awn* geniculate, longer than body of lemma; *callus* short, semicircular, hairy; *palea* finely nerved, 2-keeled, keels not winged. **Lodicules** 2, narrowly cuneate. **Stamens** 2. **Ovary** glabrous; styles free, plumose above. **Caryopsis** lanceolate, longitudinally grooved, glabrous. $x = 12$.

Species 5, Africa and Madagascar; 1 in sthn Afr.: *Trichopteryx dregeana* Nees, Northern Province, Mpumalanga, KwaZulu-Natal to Eastern Cape.

Tripogon Roem. & Schult. 9903180

(Chloridoideae—Eragrostideae—Eleusininae)

Roemer & Schultes: 34 (1817); Chippindall: 122 (1955); Pilger: 38 (1956); Launert: 210 (1970a); Phillips & Launert: 301 (1971); Phillips: 288 (1974); Clayton & Renvoize: 211 (1986); Gibbs Russell *et al.*: 345 (1990); Watson & Dallwitz: 973 (1994).

Perennial, slender, up to 220 mm tall, densely tufted. **Leaf blade** narrowly linear; leaf sheaths persistent at base, sometimes becoming fibrous; *ligule* a narrow, fringed membrane or a fringe of hairs. **Inflorescence** a solitary, terminal, subsecund spike; *spikelets* usually appressed to rachis, alternating in 2 rows along slender triangular rachis; glumes dorsiventral to rachis. **Spikelet** linear-elliptic, laterally compressed, disarticulating above glumes and between florets; *glumes* unequal, shorter than spikelet, membranous, keeled, 1-nerved or rarely upper glume 3-nerved; lower glume often asymmetrical. **Florets** 5–10, all bisexual except terminal floret reduced; *lemma* membranous, glabrous, dorsally rounded or obtusely keeled, 1–3-nerved, rarely with 1 or 2 additional faint nerves, emarginate to 2-lobed, central nerve terminating in a mucro or slender *awn*, rarely laterals mucronate; *callus* short, villous; *palea* shorter than lemma, 2-keeled, keels usually winged, hyaline. **Lodicules** 2, truncate. **Stamens** 2 or 3. **Ovary** glabrous; styles plumose. **Caryopsis** narrow, subterete, obtusely trigonous in cross section. $x = 10$.

Species ± 30, tropical Africa and India, Australia; 1 in sthn Afr.: *Tripogon minimus* (A.Rich.) Hochst. ex Steud., Namibia, Botswana, northern provinces of South Africa including Mpumalanga.

Triraphis R.Br. 9903500

(Chloridoideae—Eragrostideae—Eleusininae)

Brown: 185 (1810); Stapf: 650 (1900); Chippindall: 124 (1955); Pilger: 46 (1956); Clayton: 128 (1970); Launert: 210 (1970a); Clayton & Renvoize: 205 (1986); Gibbs Russell *et al.*: 345 (1990); Watson & Dallwitz: 976 (1994).

Annual or perennial, tufted, rhizomatous. **Leaf blade** narrow, expanded or rolled; *ligule* a fringed membrane or a fringe of hairs. **Inflorescence** an open or contracted panicle, rarely spike-like. **Spikelet** laterally compressed; disarticulating above glumes and between florets; *glumes* ± equal or unequal, shorter than spikelet, narrowly lanceolate, 1-nerved, mostly 2-lobed, awned. **Florets** 3–24, bisexual; *uppermost florets* reduced; *lemma* scarious or membranous, keeled, 3-nerved, long-hairy on lateral nerves or all nerves, deeply 3-lobed, 3-awned as each lobe is awned, lateral awns shorter than central awn; *awns* slender, straight; *callus* hairy; *palea* shorter than lemma, hyaline. **Lodicules** 2, minute, delicate, glabrous. **Stamens** 3. **Ovary** glabrous; styles plumose. **Caryopsis** linear, trigonous. $x = 10$.

Species 7, Africa and Arabian Peninsula, 1 in Australia; 5 in sthn Afr., widespread.

Tristachya Nees 9901740

(Panicoideae—Arundinelleae)

Nees ab Esenbeck: 458 (1829); Stapf: 452 (1899); Chippindall: 275 (1955); Conert: 296 (1957); Phipps: 105, 109 (1964); Launert: 213 (1970a); Clayton: 421 (1974); Clayton & Renvoize: 318 (1986); Clayton: 204 (1989); Gibbs Russell *et al.*: 347 (1990); Watson & Dallwitz: 980 (1994).

Perennial, tufted. **Leaf blade** expanded or rolled; *ligule* a fringe of hairs. **Inflorescence** an open or contracted panicle or raceme; spikelets usually in triads, rarely in pairs, pedicels of triads entirely or partly fused, thus mimicking a single spikelet, rarely pedicels free, pedicels slender, often of different lengths, longest pedicel much longer than shortest pedicel. **Spikelet** large, 10–45 mm long, laterally to not noticeably compressed, disarticulating above glumes; *glumes* unequal, lanceolate, ± persistent, chartaceous or subcoriaceous, 3–5-nerved, glabrous or hairy, hairs usually tubercle-based; upper glume usually as long as spikelet. **Florets** 2; *lower floret* male; lemma membranous, 3–7-nerved, glabrous or hairy, awnless; palea well developed; *upper floret* bisexual; *lemma* convolute, similar to firmer in texture to glumes, usually cartilaginous, 5–9-nerved, glabrous or hairy, hairs not in tufts, incised, 2-lobed, lobes awnless or awned, central awn from between lobes; *awn* geniculate and twisted, usually longer than body of lemma; *callus* conical, pungent, pubescent; *palea* membranous, 2-keeled, hyaline, keels thickened but not winged. **Lodicules** 2, cuneate, very fleshy. **Stamens** 3. **Ovary** obovoid to oblong, glabrous or apex hairy; styles plumose. **Caryopsis** longitudinally grooved; embryo large. $x = 10$, 12 (polyploidy).

Species ± 22, tropical and sthn Afr., Madagascar, tropical America; 6 in sthn Afr., N Namibia, Botswana, northern provinces of South Africa, Swaziland, Free State, KwaZulu-Natal and Eastern Cape.

Urelytrum Hack. 9900170

(Panicoideae—Andropogoneae—Rottboelliinae)

Hackel: 25 (1887); Stapf: 330 (1898); Chippindall: 516 (1955); Clayton & Renvoize: 832 (1982); Clayton & Renvoize: 361 (1986); Gibbs Russell *et al.*: 349 (1990); Watson & Dallwitz: 988 (1994).

Perennial, rarely annual, erect, tufted. **Leaf blade** linear, flat or rolled, glabrous or loosely hairy, glaucous, auricles from leaf sheaths present; *ligule* an unfringed membrane, almost hyaline. **Inflorescence** of 1, rarely 2, racemes, solitary or subdigitate, terminal, cylindrical or slightly flattened, spike-like or rigid, elongated, disarticulating easily and obliquely; internodes stout, clavate, tip crateriform with lobed scarious rim, pedicels free of rachis, racemes obliquely jointed; *spikelets* in pairs, in long-short combinations: one sessile, the other pedicelled. **Sessile spikelet** 7–8 mm long, dorsiventrally compressed, elliptic, falling with glumes, adjacent joint of rachis and pedicel; *glumes* ± equal, dissimilar, awnless; lower glume coriaceous, hairy or glabrous, flattened on back, 2-keeled towards tip, wingless; upper glume membranous, boat-shaped, keeled. **Florets** 2; *lower floret* male; lemma hyaline, 2-nerved, awnless; palea present; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, entire, delicately hairy, awnless; *callus* oblique, broadly obtuse to cuneate, hairy, inserted into top of internode; *palea* almost equalling lemma. **Lodicules** 2, fleshy, cuneate, glabrous. **Stamens** 3. **Ovary** narrowly oblong, terete at middle, glabrous; styles linear, plumose. **Caryopsis** ellipsoid.

Pedicelled spikelet with lower glume drawn out into a long curved awn, awn 5–120 mm long; florets 2, both male, rarely one bisexual or sterile and reduced to glumes. $x = 10$.

Species 7, tropical Africa; 1 in sthn Afr.: *Urelytrum agropyroides* (Hack.) Hack., N Namibia, northern provinces of South Africa, Free State, KwaZulu-Natal and Swaziland.

Urochloa P.Beauv. 9901100

(Panicoideae—Paniceae—Setariinae)

Palisot de Beauvois: 52 (1812); Stapf: 384 (1898); Stapf: 586 (1920); Chippindall: 380 (1955); Clayton & Renvoize: 600 (1982); Clayton & Renvoize: 284 (1986); Webster: 228 (1987); Clayton: 79 (1989); Gibbs Russell *et al.*: 350 (1990); Watson & Dallwitz: 991 (1994).

Annual or perennial, tufted or decumbent, sometimes stoloniferous. **Leaf blade** expanded; *ligule* a fringed membrane to a fringe of hairs. **Inflorescence** of 2–many or solitary, 1-sided racemes, scattered alternately on a central axis; rachis 3-angled or flat; *spikelets* solitary or paired, more rarely in clusters of 3 or 4; pedicels often reduced to disc-tipped stumps; lower glume turned away from rachis (abaxial). **Spikelet** dorsiventrally compressed, plano-convex, ovate or lanceolate, falling entire at maturity; *glumes* unequal, dissimilar, awnless; lower glume usually shorter than spikelet, 3–5-nerved; upper glume as long as spikelet, 5–11-nerved. **Florets** 2; *lower floret* male or sterile; lemma 5–7-nerved, resembling upper glume, awnless; palea almost as long as lemma or reduced, 2-keeled; *upper floret* bisexual; *lemma* shorter than spikelet, firmer than glumes, indurated, entire, rounded at apex, margins inrolled and clasping only edges of palea, rugose, faintly 5–7-nerved, mucronate or awned; *awn* scabrid, straight, shorter than spikelet; *palea* obtuse, almost as long as and same texture as lemma, 2-keeled. **Lodicules** 2, small, cuneate. **Stamens** 3. **Ovary** glabrous; styles plumose. **Caryopsis** broadly ellipsoid to subrotund, dorsiventrally compressed. $x = 7$, 9, 15 (polyploidy).

Species ± 12; 6 in sthn Afr., widespread.

Vetiveria Bory 9900490

(Panicoideae—Andropogoneae—Sorghinae)

Bory: 43 (1822); Stapf: 156 (1917); Chippindall: 496 (1955); Clayton & Renvoize: 739 (1982); Clayton & Renvoize: 342 (1986); Gibbs Russell *et al.*: 352 (1990); Watson & Dallwitz: 997 (1994).

Perennial, tufted, coarse, with stout rhizomes; roots often aromatic. **Leaf blade** linear; sheaths glabrous, com-

pressed, keeled, especially in lower part; *ligule* a fringed membrane to a fringe of short hairs. **Inflorescence** a terminal panicle of many, slender racemes, arranged in whorls along central axis; racemes fragile, internodes and pedicels linear, disarticulating transversely; *spikelets* paired, in long-short combinations: one sessile, the other pedicelled. **Sessile spikelet** laterally compressed, falling with glumes, joint and pedicel; *glumes* ± equal, dissimilar, shortly awned, (at least one of them); lower glume rounded on back, 5-nerved, armed with short tubercle-based spines; upper glume 3-nerved. **Florets** 2; *lower floret* sterile, reduced to a lemma, awnless; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, not keeled, glabrous, incised, 2-lobed, awned from sinus; *awn* straight or curved, glabrous, often inconspicuous; *callus* rounded, fitting in slightly hollowed tip of internode, hairy with short hairs; *palea* minute, hyaline, nerveless. **Lodicules** 2, fleshy, glabrous. **Stamens** 3. **Ovary** glabrous. **Caryopsis** oblong.

Pedicelled spikelet usually smaller than sessile spikelet, male or sterile; lemma awnless. $x = 5, 10$ (polyploidy).

Species 10, tropical Africa, Asia and Australia; 1 in sthn Afr.: *Vetiveria nigritana* (Benth.) Stapf, N Namibia and N Botswana.

Vossia Wall. & Griff. 9900160

(Panicoideae—Andropogoneae—Rottboelliinae)

Wallich & Griffith: 572 (1836) name conserved, not of Adanson (1763); Stapf: 51 (1917); Clayton & Renvoize: 831 (1982); Clayton & Renvoize: 363 (1986); Gibbs Russell *et al.*: 353 (1990); Watson & Dallwitz: 1001 (1994).

Perennial, submerged or floating, rooting from submerged nodes. **Culms** terete, glabrous, spongy. **Leaf blade** linear, broad, flat, tapering to a fine point, glaucous; *ligule* a fringed membrane. **Inflorescence** of 1–many, pale green or straw-coloured racemes, digitate to subdigitate on a short axis; racemes erect, flattened, rigid or slightly nodding, stout; internodes and pedicels stout, thickened, disarticulating transversely at joints but rachis not very fragile, pedicels free; *spikelets* paired, in long-short combinations: one sessile, the other pedicelled. **Sessile spikelet** 20–40 mm long, dorsiventrally compressed, flat or slightly rounded across back, falling with glumes; *glumes* unequal (if awn is taken into consideration), dissimilar; lower glume flat on back, 2-keeled, scrabrid on keels, narrowly winged above, drawn out into a long, flattened, awn-like tail; upper glume boat-shaped. **Florets** 2; *lower floret* male; lemma hyaline, 2-nerved, awnless; palea present, hyaline; *upper floret* bisexual; *lemma* less firm than glumes, hyaline, entire, awnless; *callus* truncate; *palea* 2-nerved. **Lodicules** 2, large, fleshy, broadly cuneate, glabrous. **Stamens** 3. **Ovary** glabrous; style branches 2, plumose.

Pedicelled spikelet similar to but smaller than sessile spikelet, bisexual or male only. $x = 10$.

Species 1: *Vossia cuspidata* (Roxb.) Griff., tropical Africa and India; Namibia (Caprivi) and N Botswana.

*Vulpia C.C.Gmel. 9904180

(Pooideae—Poeae)

Gmelin: 8 (1805); Stapf: 723 (1900); Chippindall: 59 (1955); Hubbard: 63 (1970); Stace & Cotton: 154 (1980); Clayton & Renvoize: 96 (1986); Gibbs Russell *et al.*: 354 (1990); Watson & Dallwitz: 1003 (1994).

Annual, tufted or culm solitary. **Leaf blade** linear, flat or rolled; sheaths rather loose, smooth and glabrous; *ligule* an unfringed membrane. **Inflorescence** a panicle, spike-like or open, rarely a raceme; *spikelets* pedicelled, ± secund. **Spikelet** 6–20 mm long, laterally compressed, usually disarticulating above glumes; *glumes* unequal, usually shorter than spikelet, dissimilar, rounded on back, awnless or awned; lower glume sometimes minute, 0–1-nerved; upper glume 1–3-nerved, acute to acuminate. **Florets** 2–many, bisexual, sometimes upper ones reduced to lemma; *lemma* tapered, 3–5-nerved, entire, awned; *awn* median, apical, straight, more than half as long as to longer than body of lemma; *callus* short, glabrous; *palea* 2-keeled, hyaline. **Lodicules** 2, unequally lobed. **Stamens** 1 or 2, rarely 3. **Ovary** glabrous or minutely hairy at apex. **Caryopsis** linear or ellipsoid. $x = 7$ (polyploidy).

Species ± 23, temperate regions, mostly Mediterranean; 4 naturalised in sthn Afr., Mpumalanga, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape.

Willkommia Hack. 9903100

(Chloridoideae—Cynodonteae—Chloridinae)

Hackel: 145 (1888); Launert: 49 (1970a) under *Craspedorhachis* Benth.; Clayton & Renvoize: 239 (1986); Gibbs Russell *et al.*: 355 (1990); Watson & Dallwitz: 1007 (1994).

Annual or perennial (sometimes short-lived), tufted, stoloniferous, mat-forming. **Leaf blade** linear, margins usually thickened; *ligule* a fringe of hairs. **Inflorescence** of spike-like main branches widely scattered or closely arranged along central axis; *spikelets* shortly pedicelled. **Spikelet** 2–5 mm long, dorsiventrally compressed, disarticulating above glumes, distinct elongated internode between and above glumes, rounded on back; *glumes* very unequal, slightly longer than spikelet, membranous, obtuse to acute, glabrous or long-ciliate on nerves, awnless; lower glume nerveless; upper glume 1-nerved. **Floret** 1, bisexual; *lemma* less firm to similar in texture to glumes, thinly membranous, broadly rounded, entire, acute to obtuse, 3-nerved, hairy, awned; *awn* minute, straight; *callus* pungent; *palea* glabrous or silky-hairy. **Lodicules** 2, fleshy, glabrous. **Stamens** 3. **Ovary** glabrous. **Caryopsis** ellipsoid.

Species 4, southern tropical Africa and Texas, United States of America; 3 in sthn Afr., mainly N Namibia and Botswana.

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Pontederiaceae

(Liliidae—Haemodorales)

Compiled by R.P. Glen

Aquatic, perennial or annual, glabrous, erect herbs with sympodially branching rhizomes or stems, rooting or free-floating. **Leaves** alternate or in basal rosettes; petioles usually sheathing, often long, sometimes inflated with aerenchyma, often dimorphous: lamina of emergent leaves expanded with parallel, curved-convergent veins, submerged leaves linear; sheaths sometimes ligulate; stipule-like structures sometimes present. **Flowers** bisexual (sometimes cleistogamous), ± regular to irregular, solitary or in terminal spikes or racemes subtended by a spathe-like sheath, ebracteate; usually insect-pollinated. **Perianth** 3 + 3, petaloid, usually forming a short tube; blue, white or yellow, marcescent. **Stamens** 3 + 3, 3 or 1 (in cleistogamous flowers); filaments free, arising on perianth tube at different levels; anthers 2-thecous, dorsifixed or basifixed, opening by longitudinal or apical (*Monochoria*) slits. **Ovary** superior, of 3 fused carpels, ± completely 3-locular, with many ovules on intruding parietal to axile placentas, or, by reduction, 1-locular with 1 pendulous ovule (*Pontederia*); style filiform, sometimes of 3 different lengths (tristylous;

e.g. in *Pontederia*); stigma entire or shortly lobed. **Fruit** a loculicidal, thin-walled capsule or a nut (*Pontederia*). **Seeds** small, ovoid, longitudinally ribbed; embryo cylindrical; endosperm starchy, copious.

Genera 9, species ± 36, widespread in tropics and subtropics; sthn Afr.: genera 4, species 4.

Brown: 1 (1897); Podlech: 1 (1969); Dahlgren *et al.*: 340 (1985); Obermeyer: 61 (1985); Cook: 193 (1990).

Key to genera

1a Fruit a 1-seeded nut, enclosed by the hardened base of the perianth tube ..... ***Pontederia**
1b Fruit a 3-locular, many-seeded capsule; not enclosed by the base of a modified perianth tube:
2a Stamens 6:
3a Perianth segments free to base ..... **Monochoria**
3b Perianth segments united into a tube below ..... **Eichhornia**
2b Stamens 3 ..... **Heteranthera**

Eichhornia Kunth 0921000

Kunth: 3 (1842); Podlech: 1 (1969); Obermeyer: 63 (1985); Cook: 193 (1990).

Perennial aquatic herbs, rooting in mud or free-floating. **Roots** many, long and feathery in floating plants. **Leaves** dimorphous; the emergent ones with often swollen, long petioles, and obovate, orbicular, spathulate or lanceolate blades; submerged leaves alternate, linear, with petioles sheathing stems, shortly stipulate. **Flowers** in well-developed spikes or these reduced to 1 or 2 flowers. **Perianth** funnel-shaped, with a somewhat curved tube and 6 subequal spreading lobes, blue or mauve. **Stamens** 3 + 3, upper included, lower exserted; anthers dorsifixed, oblong, opening by longitudinal slits. **Ovary** 3-locular; ovules many; style filiform; stigma slightly dilated, entire or very shortly lobed. **Capsule** spindle-shaped, covered with marcescent perianth. **Seeds** many, small, ovoid, finely ribbed. $x = 8$ (aneuploids, polyploidy).

Species 7, tropical America and Africa; 1 in sthn Afr.: *Eichhornia natans* (P.Beauv.) Solms, N Namibia and Botswana. **E. crassipes* (Mart.) Solms (Water hyacinth), originally from South America, has become one of the world's worst pests of waterways; in South Africa it is a declared weed and prohibited as an ornamental plant.

Heteranthera Ruiz & Pav. 0924000

Ruiz & Pavon: 9 (1794); Brown: 1 (1897); Podlech: 2 (1969); Obermeyer: 68 (1985); Cook: 194 (1990).

Perennial aquatic herbs, rhizomatous, rooting in mud. **Leaves** with long swollen spongy petiole with expanded sheathing bases; blade cordate, hastate, or ovate, or sometimes all leaves submerged and linear. **Flowers** small, in terminal spike, rarely 2 or solitary, occasionally some cleistogamous. **Perianth** nearly regular, salver- or funnel-shape, blue, accrescent. **Stamens** 3 (1 in cleistogamous flowers), exserted; filaments arising from throat of tube; median stamen occasionally longer; anthers dorsifixed, opening by longitudinal slits. **Ovary** 1-locular or imperfectly 3-locular, with 3 parietal, multiovulate placentas; style filiform; stigma small. **Capsule** oblong or terete. **Seeds** many, ovoid, terete.

Species ± 9, tropical to subtropical regions of Africa and America; 1 in sthn Afr.: *Heteranthera callifolia* Rchb. ex Kunth (= *H. kotschyana* Fenzl ex Solms), Namibia, Botswana and from the Nylsvlei area in the Northern Province.

Monochoria C.Presl 0920000

Presl: 127 (1827); Verdcourt: 80 (1961); Obermeyer: 61 (1985); Cook: 194 (1990); Sainty & Jacobs: 30 (1994).

Annual or perennial aquatic herbs, erect, usually deciduous, rhizomatous. **Leaves** radical, emergent, petiolate, with cordate to ovate blade, extremely variable as to size and shape. **Flowers** pedicelled, racemose or subumbellate. **Perianth** segments free, subequal, blue, marcescent. **Stamens** 3 + 3, arising from base of segments, unequal, the largest with an erect tooth on one side of filament; anthers erect, basifixed, opening by apical slits. **Ovary** 3-locular, with axile placentas, many-ovulate; style filiform; stigma apical, small. **Capsule** spindle-shaped, with thin pericarp enclosed by marcescent perianth. **Seeds** many, minute, ovoid, with several thin ribs. $x = 10, 13, 14$ (aneuploids, high polyploidy).

Species 8, tropical Africa, Asia and Australia, naturalised in Europe; 1 in sthn Afr.: *Monochoria africana* (Solms) N.E.Br., only known from central and southern parts of the Kruger National Park and from a neighbouring private game reserve (Mpumalanga); apparently annual, growing in or around the edge of pans.

***Pontederia** L. 0922000

Linnaeus: 288 (1753); Cook: 194 (1990); Obermeyer: 66 (1985); Lowden: 449 (1973).

Perennial emergent herb; stem erect, 1-leaved, with several sheathing, bract-like leaves at base. **Leaves** obtuse, margins entire with parallel, outwardly curved-convergent venation; blades lanceolate, ovate, cordate, sagittate, hastate or reniform; foliage dark green to greyish. **Petiole** of leaf of floral shoot short; petioles of other leaves long; bases sheathing and clasping, sheaths ligulate. **Inflorescence** a spike with few to many blue, white or white-green flowers, enclosed by a spathe and petiole base of leaf of floral shoot. **Flowers** irregular, bilabiate, largest perianth lobe with a bilobed yellow spot. **Stamens** unequal, in two groups of 3 each, adnate to perigone tube; anthers introrse, dorsifixed, versatile, dehiscing longitudinally; filaments and perigone tube covered with hairs terminating in pinhead-like glands. **Ovary** with 2 carpels aborted and 1 fertile, 1-locular, 1-ovulate; ovule pendulous, anatropous; placentation parietal. **Fruit** a 1-seeded, indehiscent nut, enclosed by a hardened perigone base, toothed, smooth or with spinulose ridges; pericarp rich in glutin. **Seeds** reniform or ovoid; endosperm white, copious, surrounding a cylindrical embryo. $x = 8$ (polyploidy).

Species 4, tropical to warm America, naturalised in Australia, Europe and sthn Afr.: **Pontederia cordata* L. var. *ovalis* Solms, originally from tropical South America, is sold in local nurseries as an ornamental water plant and has become naturalised locally and may become invasive.

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Potamogetonaceae

(Alismatidae—Najadales)

Compiled by R.P. Glen

Aquatic, herbaceous perennials, occasionally annuals, with deciduous stems forming colonies in fresh or brackish water, either submerged, except for spikes, which are exserted during anthesis, or in some species, leaf blades floating. **Roots** in a circle around nodes of rhizome, rooted in substrate. **Rhizomes** usually well developed, sympodial, persistent, rarely 0, or plants perennating by formation of winterbuds ('turions'). **Stems** elongate, flexible, submerged or floating, or stoloniferous and creeping. **Leaves** submerged and/or floating, alternate and/or opposite, simple, entire, often heteromorphic, parallel-veined; floating leaves broad, ovate and petiolate; submerged leaves capillary to lanceolate or elliptic, usually with a well-developed, convolute or tubular, stipular sheath. **Inflorescence** pedunculate spikes, with two flowers in *Ruppia* and several in *Potamogeton,* exserted, surrounded by a basal sheath. **Flowers** bisexual, regular, ebracteate, small, usually wind-pollinated. **Perianth** of (2–)4 bract-like, broad, fleshy appendages arising opposite each stamen, sometimes considered as an appendage of the stamens. **Stamens** 4, extrorse, arising from claws of segments; anthers 2-thecous, sessile, with longitudinal slits. **Ovary** superior; carpels (3)4(–8), free, unilocular; ovule solitary, campylotropous or anatropous at maturity. **Fruit** an achene or drupe, usually floating (pericarp aerenchymatous). **Seeds**: hypocotyl well developed; endosperm 0. $x = 13$ (7, 12) (aneuploids, high polyploidy).

Genera 2, ± 90 species, subcosmopolitan; sthn Afr.: genus 1, species 7.

Linnaeus: 126 (1753); Bennett: 45 (1897) under Naiadaceae; Obermeyer: 60 (1966); Dahlgren *et al.*: 312 (1985); Cook: 199 (1990); Brummitt: 743 (1992).

Potamogeton L. 0058000

Linnaeus: 126 (1753); Bennett: 45 (1897) under Naiadaceae; Obermeyer: 60 (1966); Dahlgren *et al.*: 315 (1985); Cook: 202 (1990).

Description as for family.

Species ± 90; 7 in sthn Afr.: *Potamogeton pectinatus* L. and *P. pusillus* L. throughout sthn Afr., remaining species more common in the summer-rainfall area.

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Prioniaceae

(Commelinidae—Juncales)

Compiled by R.P. Glen

Robust aquatic shrubs up to 2 m tall, forming dense, strongly rooted stands, stoloniferous and caulescent with leaves in dense, apical rosettes. **Stems** persistent, branched at base, densely covered with reticulate, fibrous, dark leaf remains. **Leaves** linear-acuminate, ± 1 m long, margin and keel sharply serrate to serrulate, with a tubular sheathing base. **Inflorescence** a large, much-branched terminal panicle on a long, trigonous peduncle; each branchlet bearing few- to many-flowered lateral fascicles supported by funnel-shaped, caudate bracts diminishing in size upwards. **Flowers** bisexual, regular, small, pedicellate. **Perianth** 3 + 3; segments free, equal, ovate, rigid, brown. **Stamens** 3 + 3, as long as perianth segments or longer and exserted; filaments filiform; anthers oblong, basifixed, with opposing thecae opening lengthwise. **Ovary** superior, 3-locular, ovoid, with 3–6 ovules in each locule on axile placentas; style short or 0; stigmatic branches long, papillate. **Capsule** enclosed in perianth, ovoid-acute, 3-valved. **Seeds** 1 or 2 per locule, ovoid-oblong.

Prionium was originally included in the family Juncaceae. Research based on anatomy, morphology and *rbc*L sequence data indicates that *Prionium* should be placed in a family of its own (Cutler, 1969; Plunket *et al.*, 1995; Munro & Linder, 1998). The new monotypic family Prioniaceae S.L.Munro & H.P.Linder was therefore erected (Munro & Linder: 51; 1998).

Prionium E.Mey. 0930000

Meyer: 131 (1832); Brown: 28 (1897); Obermeyer: 71 (1985); Munro & Linder: 43 (1998); Cook: 108 (1990).

Description as for family.

Species 1: *Prionium serratum* (L.f.) Drège ex E.Mey., endemic to the Western and Eastern Cape as well as S KwaZulu-Natal. Common in river beds around the coast, extending inland as far as Tulbagh in the Western Cape.

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Restionaceae

(Commelinidae—Restionales)

Compiled by C. Archer

Perennial, rush- or sedge-like herbs, with a tufted or rhizomatous rootstock densely covered with scaly sheaths, dioecious, rarely monoecious or sometimes florets bisexual. **Culms** photosynthetic, erect or rarely reclining, simple or branched, terete, quadrate or compressed, solid or fistular with a leaf sheath at each node. **Leaf sheaths** usually convolute, free at margins, rarely produced at apex into a blade-like extension, caducous or persistent; ligule usually 0. **Inflorescence** a spike, raceme or panicle, frequently different in the sexes. **Spikelets** 1–many, with 1–many florets, subtended by a sheath-like spathe at base. **Florets** unisexual, rarely bisexual, mainly hidden within bracts. **Perianth** glumaceous, usually of 6 segments in 2 whorls, rarely less or 0; outer lateral segments frequently conduplicate and ± keeled; inner segments usually rounded on outer side. **Male florets**: stamens 3, opposite inner perianth segments; filaments very slender; anthers 1(2)-thecous; ovary rudimentary or 0. **Female florets**: staminodes 0–3; ovary superior, 1–3-locular, sometimes 1 or 2 by abortion, with a solitary pendulous ovule in each locule; styles 1–3, free or partly united. **Fruit** a capsule or nutlet.

Genera ± 28, species ± 400, only southern hemisphere, except for 1 species in Vietnam, mainly sthn Afr. (Western Cape), several also in Australia, Tasmania and New Zealand, few in tropical Africa, Madagascar, Indochina and Chile; sthn Afr.: genera 19, species ± 320, almost exclusively in Western Cape.

Masters: 59 (1897); Pillans: 207 (1928); Pillans: 339 (1942); Pillans: 245 (1944); Pillans: 101 (1952); Linder: 11 (1984); Linder: 387 (1985); Linder: 209 (1991).

Key to genera and some species

1a Style 1:
  2a Fruit dehiscent ..... **Ischyrolepis feminea**
  2b Fruit indehiscent:
    3a Perianth chartaceous; a rare plant of the Great Swartberg ..... **Staberoha stokoei**
    3b Perianth cartilaginous:
      4a Male spikelets erect ..... **Calopsis monostylis**
      4b Male spikes pendent ..... **Thamnochortus**
1b Styles 2 or 3:
  5a Styles 2:
    6a Ovary dehiscent:
      7a Styles fused at the base, if free, bracts longer than florets ..... **Ischyrolepis**
      7b Styles free; bracts shorter than florets ..... **Chondropetalum microcarpum**
    6b Ovary indehiscent:
      8a Culms simple:
        9a Male florets in spikelets:
          10a Male spikelets pendent; nutlet enclosed by perianth ..... **Staberoha**
          10b Male spikelets erect; perianth shorter than nutlet, if as large, then hyaline:
            11a Nutlet flattened on one side; female spikelets usually with several florets ..... **Cannomois**
            11b Nutlet round in cross section:
              12a Male bracts acute; female spikelets always with a single floret ..... **Hypodiscus**
              12b Male bracts rounded; female spikelets with several florets ..... **Nevillea**
        9b Male florets racemose:
          13a Perianth segments of male florets valvate, lanceolate ..... **Ceratocaryum**
          13b Perianth segments of male florets linear ..... **Willdenowia**
      8b Culms branching:
        14a Female spikelets with several florets:
          15a Bracts of female florets hyaline-chartaceous ..... **Hydrophilus**
          15b Bracts of female florets coriaceous to osseous:
            16a Bracts shorter than perianth ..... **Chondropetalum microcarpum**
            16b Bracts longer than perianth:
              17a Nutlet shorter than 5 mm ..... **Calopsis esterhuyseniae**
              17b Nutlet longer than 10 mm ..... **Cannomois**
        14b Female spikelets with a solitary floret:
          18a Bracts shorter than perianth and nutlet ..... **Elegia**
          18b Bracts overtopping perianth and nutlet:
            19a Bracts of male florets similar to perianth lobes, linear, hyaline; male florets in racemes ..... **Willdenowia**
            19b Bracts of male florets larger than perianth, not linear; male florets in spikelets:

20a Bracts of female florets osseous; male florets in cone-like spikelets ..... **Mastersiella**
20b Bracts of female florets chartaceous; male flowers in few-flowered spikelets ..... **Anthochortus**
5b Styles 3:
21a Sheaths usually caducous; bracts shorter than florets, or if longer, then hyaline and lacerate:
22a Ovary 1-locular, indehiscent ..... **Elegia**
22b Ovary 3-locular, usually at least some locules dehiscent:
23a Culms branching ..... **Dovea**
23b Culms simple:
24a Bracts longer than florets ..... **Askidiosperma**
24b Bracts shorter than florets, or if longer, then not hyaline ..... **Chondropetalum**
21b Sheaths persistent; bracts usually cartilaginous, often overtopping florets:
25a Culms ± compressed; sheaths green with a stout mucro; seeds white with a fragile surface ..... **Platycaulos**
25b Culms terete, if compressed, then not with above characters:
26a Culms with a simple central axis, and with sterile and/or fertile branches clustered at nodes; male spikelets pendent ..... **Rhodocoma**
26b Culms usually branching, if simple, then without branches clustered at nodes; male spikelets erect:
27a Fruit a capsule, or if a nutlet, then bracts narrowly lanceolate, concolorous:
28a Culms branching ..... **Restio**
28b Culms simple:
29a Bracts shorter than florets; spikelets many at several nodes ..... **Chondropetalum**
29b Bracts at least as long as florets; spikelets few to several ..... **Restio**
27b Fruit a 1-locular nutlet:
30a Culms branching ..... **Calopsis**
30b Culms simple ..... **Staberoha**

Anthochortus Nees 0804170

Nees ab Esenbeck: 451 (1836); Masters: 148 (1897); Pillans: 432 (1928); Linder: 484 (1985); Linder: 256 (1991).

Hypolaena R.Br.: 251 (1810) in part. *Phyllocomos* Mast.: 19 (1900); Pillans: 433 (1928).

Plants generally tangled, forming cushions, rarely monoecious, or florets bisexual. **Rhizomes** 0. **Culms** branching, sometimes flattened or striate. **Leaf sheaths** closely convolute, apex often with a long, hair-like mucro. **Male inflorescence** of several spicate spikelets. **Male spikelets** with several bracts fertile; anthers exserted at anthesis. **Female inflorescence** similar to male, but with fewer spikelets, of 1–several spicate spikelets; spathes similar to sheaths. **Female spikelets** similar to male ones, bracts chartaceous to cartilaginous, with 1 fertile; perianth segments membranous, subequal; ovary 1-locular; styles 2. **Fruit** a soft-walled nutlet.

Species ± 7, Western Cape.

Askidiosperma Steud. 0804070

Steudel: 257 (1855); Masters: 98 (1897); Linder: 431 (1985); Linder: 249 (1991).

Chondropetalum Rottb.; Pillans: 297 (1928) in part; Pillans: 255 (1944); Pillans: 106 (1952).

Plants tightly caespitose. **Rhizomes** usually very short. **Culms** simple. **Leaf sheaths** caducous. **Male inflorescence** very similar to female. **Male spikelets**: florets sometimes smaller than female ones; pollen released inside perianth segments. **Female inflorescence** of many elongated, poorly defined spikelets clustered at several fertile nodes; spathellae and bracts taller than florets, hyaline and soon lacerate, persisting as hairs around maturing florets; spathes taller or smaller than spikelets, papery to cartilaginous. **Female spikelets**: perianth segments osseous, usually acute, backs all rounded, inner segments usually longer than outer ones; staminodes well developed; ovary 3-locular; styles 3, plumose. **Fruit** at least partly dehiscent.

Species ± 10, Western Cape.

Calopsis P.Beauv. ex Desv. 0804100

Desvaux: 44 (1828); Linder: 464 (1985); Linder: 251 (1991).

Leptocarpus R.Br.: 250 (1810); Masters: 116 (1897); Pillans: 342 (1928) in part.

Plants caespitose or tangled. **Rhizomes** very short. **Culms** branching, sometimes sparsely. **Leaf sheaths** persistent, either closely convolute or somewhat spreading. **Male inflorescence** similar to female ones, paniculate with (1–)many discrete, compact spikelets; spathes relatively insignificant. **Male spikelets**: florets many; perianth compressed; perianth segments 6, outer lateral ones usually boat-shaped, villous to glabrous on midrib; anthers exserted at anthesis. **Female inflorescence** similar to male, but spikelets often somewhat larger. **Female spikelets**: bracts cartilaginous or osseous, usually somewhat longer than florets, usually uppermost 1–many fertile; perianth segments cartilaginous or bony, outer lateral perianth segments keeled, rarely winged or villous; staminodes well developed; ovary 1-locular, styles usually 3, plumose, exserted from behind bracts at anthesis. **Fruit** a soft-walled nutlet.

Species ± 24, mainly Western Cape, also Northern Cape (Namaqualand) and Eastern Cape to KwaZulu-Natal.

Cannomois P.Beauv. ex Desv. 0804140

Desvaux: 43, t. 3, fig. 1 (1828); Masters: 141 (1897); Pillans: 141 (1928); Linder: 480 (1985); Linder: 254 (1991).

Plants caespitose, rarely mat-forming. **Rhizomes** short or long. **Culms** simple or branching. **Leaf sheaths** closely convolute. **Male inflorescence** of many small spherical to elliptical spikelets; spathes caducous. **Male spikelets**: bracts small, taller than florets, cartilaginous; anthers exserted at anthesis. **Female inflorescence** of (1–)several spikelets; spathes similar to sheaths, persistent. **Female spikelets**: bracts bony, tightly convolute into spindle-shaped spikelets, with 2 or 3 bracts fertile; perianth segments 6, subequal, hyaline, small to minute; ovary 1-locular; styles 2, free to base, plumose, slightly longer to much longer than ovary. **Fruit** a shiny, adaxially flattened, black nutlet with an elaiosome.

Species ± 7, mainly Western Cape, to Albany District in Eastern Cape.

Ceratocaryum Nees 0804130

Nees ab Esenbeck: 451 (1836); Masters: 147 (1897); Linder: 479 (1985); Linder: 254 (1991).

Willdenowia Thunb.: 5 (1788) in part.

Plants caespitose or with spreading rhizomes. **Rhizomes** generally well developed. **Culms** simple. **Leaf sheaths** tightly convolute, persistent, upper margins finely lacerated. **Male inflorescence** with many paniculate florets not arranged in spikelets; spathes soon caducous. **Male spikelets**: bracts and perianth segments chartaceous, equal, white; anthers exserted at anthesis. **Female inflorescence** with large spathes partially obscuring clusters of female spikelets at fertile nodes. **Female spikelets**: bracts chartaceous, all except topmost one sterile; perianth segments small, hyaline, equal; staminodes 0; ovary 1-locular; styles 2, plumose, ± as long as ovary. **Fruit** a large, woody nutlet, without elaiosome.

Species ± 6; Western Cape.

Chondropetalum Rottb. 0804050

Rottbøll: 12 (1772); Pillans: 297 (1928), including *Dovea* Kunth and *Askidiosperma* Steud.; Linder: 427 (1985); Linder: 247 (1991).

Dovea Kunth: 457 (1841); Masters: 99 (1897).

Plants caespitose or with long or short rhizomes. **Culms** usually simple, branching only in 1 species (*C. microcarpum* (Kunth) Pillans). **Leaf sheaths** caducous or semipersistent if culms are branching. **Male inflorescence** of many small, poorly defined spikelets aggregated at several fertile nodes, overtopped by caducous spathes. **Male spikelets** with few to many florets, usually somewhat compressed, with few to 0 sterile bracts; perianth ± trigonous or compressed, often somewhat arcuate, usually much longer than subtending bract; segments 6, in 2 whorls, outer lateral ones boat-shaped, mostly keeled, glabrous or villous on keel, inner oblong or lanceolate, dorsally rounded; anthers ovate-oblong, with a prominent apiculus; ovary rudimentary. **Female inflorescence** resembling male. **Female spikelets** resembling male, generally fewer and more crowded; perianth trigonous or compressed; perianth segments osseous, often black, subequal or inner longer than outer, outer segments not keeled; staminodes well developed, strap-shaped; ovary trigonous, 3-lobed or compressed 3-locular; styles 3, free, plumose. **Fruit** a dehiscent 1–3-seeded capsule. **Seeds** highly ornamented.

Species ± 12, mainly Western Cape, from Clanwilliam District to Albany in Eastern Cape.

Dovea Kunth 0804060

Kunth: 457 (1841); Masters: 99 (1897), including *Chondropetalum* Rottb.; Linder: 431 (1985); Linder: 247 (1991).

Chondropetalum Rottb.; Pillans: 297 (1928) in part.

Plants loosely caespitose. **Rhizomes** well developed, extensively creeping. **Culms** branching. **Leaf sheaths** caducous. **Male inflorescence** of many small paniculate spikelets, aggregated at several fertile nodes. **Male spikelets**: pollen released inside perianth segments. **Female inflorescence** of a few large racemose spikelets; spathes caducous, soon exposing spikelets. **Female spikelets**: perianth segments osseous, brown, subequal, outer lateral ones not keeled; staminodes well developed; ovary 3-locular; styles 3, plumose. **Fruit** dehiscent. **Seeds** large, highly ornamented.

Species 1: *Dovea macrocarpa* Kunth, Western Cape: Clanwilliam and Piquetberg Districts.

Elegia L. 0804040

Linnaeus: 162 (1767); Masters: 104 (1897); Pillans: 313 (1928); Linder: 418 (1985); Linder: 245 (1991).

Lamprocaulos Mast.: 114 (1897).

Plants caespitose or rhizomatous. **Culms** widely spaced, erect, simple or branching, terete or compressed, often with shorter sterile stems. **Leaf sheaths** closely convolute or sometimes loose in their upper parts, persistent or caducous. **Male inflorescence** usually similar or identical to female; perianth segments woody; florets often somewhat smaller than female. **Male spikelets** many, in panicled cymes, or fewer in spicate cymes, or solitary and terminal, with many florets; perianth compressed; segments 6, outer lateral ones usually boat-shaped, villous on midrib or glabrous; ovary rudimentary. **Female inflorescence** generally of large numbers of compact spikelets clustered at several fertile nodes, these often obscured by large persistent spathes. **Female spikelets** poorly organised, with 1–many florets; bracts usually shorter than florets; perianth subtrigonous; perianth segments osseous, often black, outer lateral ones not keeled; staminodes minute or 0; ovary usually trigonous, rarely compressed, 1-locular; styles 2 or 3, short, plumose, free or connate below middle. **Fruit** a trigonous nutlet.

Species ± 35, Northern Cape (Namaqualand), Western and Eastern Cape.

Hydrophilus H.P.Linder 0804160

Linder: 66 (1984); Linder: 484 (1985); Linder: 255 (1991).

Plants weakly caespitose, often spreading through vegetation. **Culms** branching. **Leaf sheaths** tightly convoluted. **Male inflorescence** of several spicate spikelets; spathes densely imbricate, chartaceous. **Male spikelets**: bracts similar to spathes, mostly fertile; perianth segments glabrous, outer ones cartilaginous, laterals conduplicate, inner membranous. **Female inflorescence** similar to male, but florets slightly larger. **Female spikelets**: ovary 1-locular; styles 2, shortly connate at base. **Fruit** a nutlet.

Species 1: *Hydrophilus rattrayi* (Pillans) H.P.Linder, Western to Eastern Cape.

Hypodiscus Nees 0804190

Nees ab Esenbeck: 450 (1836); Masters: 135 (1897); Pillans: 399 (1928); Linder: 488 (1985); Linder: 256 (1991).

Plants caespitose. **Rhizomes** short to well developed, occasionally long-spreading. **Culms** simple, smooth or striate. **Leaf sheaths** closely convolute. **Male inflorescence** of few to many erect to suberect spikelets, each subtended by a ± conspicuous caducous spathe. **Male spikelets** with all bracts fertile; with many florets; perianth usually much compressed; perianth segments 6, or inner whorl 0; outer lateral ones mostly boat-shaped and conduplicate; anthers oblong, apiculate, exserted at anthesis; ovary rudimentary. **Female inflorescence** of 1–several spicate, compact, spindle-shaped spikelets similar to male but generally larger; spathes relatively small. **Female spikelets** with bracts cartilaginous to osseous, often acuminate, many sterile, only 1 fertile per spikelet; perianth sessile or stipitate, segments membranous, small, equal, 6 (rarely 0); staminodes minute; ovary 1-locular, apex often ornamented or with a cap; styles 2, fused basally. **Fruit** a nutlet, variously ornamented on cap.

Species ± 15, mainly Western Cape, also Northern and Eastern Cape (Namaqualand to Uitenhage).

Ischyrolepis Steud. 0804030

Steudel: 249 (1855); Linder: 397 (1985); Linder: 245 (1991).

Restio Rottb.; Masters: 61 (1897); Pillans: 210 (1928) in part.

Plants caespitose. **Rhizomes** usually not developed or short. **Culms** branching, rarely simple. **Leaf sheaths** persistent. **Male inflorescence** similar to female or different, usually with more florets, often smaller. **Female inflorescence** variable, from 1–many spikelets, variously arranged. **Female spikelets** generally spindle-shaped to ovate or rounded; bracts osseous, rarely chartaceous, somewhat taller than or slightly shorter than florets, 1–many fertile; perianth segments osseous, outer lateral ones keeled; staminodes minute; ovary 2(1)-locular; styles 2, fused at base into persistent stylopodium. **Fruit** a 1- or 2-locular capsule.

Species ± 49, mostly Western Cape, also Northern Cape (Namaqualand) and a few reaching Eastern Cape, Lesotho, KwaZulu-Natal and Mpumalanga.

Mastersiella Gilg-Ben. 0804180

Gilg-Benedict: 25 (1930); Linder: 487 (1985); Linder: 256 (1991).

Hypolaena R.Br.: 251 (1810); Masters: 130 (1897); Pillans: 390 (1928) in part.

Plants caespitose to more commonly forming low, tangled cushions. **Rhizomes** 0. **Culms** branching. **Leaf sheaths** tightly convolute. **Male inflorescence** of few to many small, cone-like spikelets; spathes similar to sheaths, caducous. **Male spikelets**: bracts cartilaginous, many, all fertile; perianth segments 6(3); anthers exserted at anthesis. **Female inflorescence** of 1–few large spikelets; spathes persistent. **Female spikelets**: bracts osseous, closely convolute, only 1 fertile; perianth stipitate or sessile, segments 6(3), membranous, subequal; ovary 1-locular; styles 2, free to base, plumose, longer than ovary. **Fruit** a shiny black nutlet with an elaiosome.

Species ± 3, Western Cape.

Nevillea Esterh. & H.P.Linder 0804150

Esterhuysen & Linder in Linder: 66 (1984); Linder: 482 (1985); Linder: 255 (1991).

Restio Rottb.; Pillans: 210 (1928) in part.

Plants caespitose. **Rhizomes** 0 or very short. **Culms** simple. **Leaf sheaths** closely convolute, persistent. **Male inflorescence** of 1(–several) erect, cone-like spikelets. **Male spikelets** with many fertile, obtuse, densely imbricate bracts; perianth segments membranous, outer lateral ones conduplicate, keeled. **Female inflorescence** spicate, of 2–5 spikelets; spathes large, obscuring spikelets. **Female spikelets** with 3–5 florets; bracts tightly convolute, osseous; perianth segments membranous, glabrous, outer laterals conduplicate; ovary 2-locular; styles 2, fused at base. **Fruit** a nutlet.

Species 2, Western Cape.

Platycaulos H.P.Linder 0804080

Linder: 64 (1984); Linder: 434 (1985); Linder: 249 (1991).

Restio Rottb.; Pillans: 210 (1928) in part.

Plants forming rounded cushions, or more commonly tangled. **Rhizomes** 0 or short. **Culms** ± compressed, branching. **Leaf sheaths** convolute, persistent, green, with a stout green apical mucro. **Male inflorescence** spicate, with large spathes, small well-defined sessile spikelets and with most bracts fertile. **Male spikelets**: perianth cartilaginous, outer lateral segments conduplicate, carinate, villous on carina, all segments imbricate; anthers exserted from perianth at anthesis. **Female inflorescence** similar to male. **Female spikelets**: florets somewhat larger than males; staminodes well developed; ovary 1–3-locular; styles 3, free, plumose, exserted from bracts at anthesis. **Fruit** a 2-locular, dehiscent capsule; seeds white with a fragile surface.

Species ± 8, W and SW Eastern Cape.

Restio Rottb. 0804090

Rottbøll: 9 (1772) name conserved; Masters: 61 (1897); Pillans: 210 (1928) in part; Linder: 437 (1985); Linder: 251 (1991).

Plants caespitose or tangled. **Rhizomes** rarely present. **Culms** terete, compressed or 4-sided, generally branching. **Leaf sheaths** persistent, convolute, ± mucronate or aristate, rarely prolonged into a foliaceous mucro. **Male inflorescence** similar to female, or very different, often with smaller spikelets, usually with more bracts fertile. **Male spikelets** usually many, in paniculate or spicate cymes, occasionally solitary and terminal, usually with many florets, each with a spathe or sheath at its base; bracts usually many and imbricate, few to many fertile; perianth of 4 or 6 segments in 2 series, usually compressed, sometimes 3-sided; segments generally unequal, rigid or membranous; outer lateral ones conduplicate, boat-shaped, often villous and keeled; anterior segments flattened or rounded; inner usually smaller, thinner and flattened; stamens exserted from florets at anthesis, anthers oblong, apiculate or muticous; ovary rudimentary or 0. **Female inflorescence** similar to male, or very different, often with larger spikelets; spikelets 1–many, variously arranged; spathes generally smaller than spikelets, sometimes much larger. **Female spikelets**: bracts various, usually several, occasionally 1 fertile, usually with some sterile bracts at base; perianth segments osseous, outer lateral ones keeled, keels often woolly; staminodes well developed; ovary 1–3-locular, styles 3, plumose, exserted from bracts at anthesis. **Fruit** capsular, compressed, 3-sided, (1)2- or 3-seeded; seeds rough with various raised patterns or smooth. $x = 7, 11, 12$ (polyploidy).

Species ± 150, sthn Afr., tropical Africa and Australia; ± 89 in sthn Afr., mainly Western Cape, also extending to Northern Cape (Namaqualand), Eastern Cape and reaching KwaZulu-Natal.

Rhodocoma Nees 0804120

Nees ab Esenbeck: 450 (1836); Linder: 478 (1985); Linder: 253 (1991); Linder & Vlok: 139 (1991).

Restio Rottb.; Pillans: 210 (1928) in part.

Plants caespitose or with spreading rhizomes. **Culms** simple, often with clusters of sterile branches at nodes. **Leaf sheaths** persistent, closely convolute, apical half usually lacerate. **Male inflorescence** paniculate; spathes persistent, similar to sheaths; pedicels flattened. **Male spikelets** several, ovate, pendulous, 3–6-flowered; bracts cartilaginous, as long as florets; perianth segments 6, chartaceous to cartilaginous, subequal; stamens 3, anthers 1-locular, dehiscing inside perianth. **Female inflorescence** of many slender, stiffly erect spikelets or with 1 spikelet at apex of each branch. **Female spikelets** with several bracts, apical 1(2) fertile; perianth segments 6, ± subequal, bony to cartilaginous, outer ones longer and more slender, inner ones shorter and wider; staminodes 3; ovary 3-locular; styles 3; free, plumose, exserted from bracts at anthesis. **Fruit** a loculicidal capsule.

Species ± 6, Western to Eastern Cape and KwaZulu-Natal.

Staberoha Kunth 0804020

Kunth: 442 (1841); Pillans: 384 (1928); Linder: 396 (1985); Linder: 244 (1991).

Thamnochortus P.J.Bergius; Masters: 119 (1897) in part.

Plants caespitose. **Rhizomes** generally short. **Culms** simple, sterile culms rarely produced. **Leaf sheaths** convolute, persistent. **Male inflorescence** of 1–10 pendent, rarely erect, usually obtriangular, rarely cylindrical spikelets; bracts large, obscuring florets. **Male spikelets** with many florets; perianth compressed, segments 6, equal or subequal, outer lateral ones boat-shaped, keeled; anthers oblong, apiculate; ovary rudimentary. **Female inflorescence** of 1–6 cylindrical to spindle-shaped, rigidly erect spikelets; bracts more than 10, all fertile, much longer than florets. **Female spikelets** with many florets; perianth compressed, persistent, lateral outer segments sometimes winged or keeled, chartaceous to osseous; staminodes minute; ovary compressed, 1-locular; styles 3, 2 or rarely 1, free or united at base, plumose. **Fruit** a compressed nutlet.

Species ± 9, Western Cape.

Thamnochortus P.J.Bergius 0804110

Bergius: 353, t. 5, fig. 8 (1767); Masters: 119 (1897); Pillans: 358 (1928); Linder: 471 (1985); Linder: 253 (1991).

Plants caespitose, sometimes forming tall, slender tussocks. **Rhizomes** often well developed, sometimes short. **Culms** simple, very rarely branching, often with clusters of sterile shoots at nodes in the year after flowering. **Leaf sheaths** persistent, closely convolute, apical half often becoming lacerate. **Male inflorescence** of many pendulous, cylindrical spikelets. **Male spikelets**: bracts chartaceous, many, all fertile; perianth compressed; perianth segments 6, outer lateral ones boat-shaped, keeled, usually longer than inner; anthers exserted at anthesis. **Female inflorescence** differing from male, of 1–several larger, stiffly erect spikelets; spathes generally small. **Female spikelets**: bracts cartilaginous, longer than florets, all fertile; perianth segments 6, cartilaginous, persistent, outer lateral ones keeled or winged; staminodes well developed; ovary 1-locular; style 1, densely brush-like, exserted from bracts at anthesis. **Fruit** a soft-walled nutlet.

Species ± 33, mostly Western Cape, also Eastern Cape, from Clanwilliam to Uitenhage; *Thamnochortus insignis* Mast., is of major economic importance for thatching.

Willdenowia Thunb. 0804200

Thunberg: 5 (1788); Masters: 143 (1897); Pillans: 419 (1928); Linder: 493 (1985); Linder: 258 (1991).

Plants caespitose, often looking untidy. **Rhizomes** variable, always present. **Culms** branching or rarely simple, smooth or striate. **Leaf sheaths** closely convolute, apical portion usually membranous and discoloured, soon decaying. **Male inflorescence** with many florets arranged in panicles, not aggregated into spikelets, partially obscured by large spathes in young florets; each floret subtended by a linear or setaceous caducous bract; bracts chartaceous, pale; perianth segments 6, linear or setaceous, chartaceous, outer longer than inner; anthers apiculate, exserted; ovary rudimentary. **Female inflorescence** of 1–few spikelets, each subtended by a conspicuous, persistent, oblong spathe. **Female spikelets**: bracts cartilaginous to chartaceous, many, only 1 fertile; perianth segments 6 or 0, when present, small, membranous, equal; ovary sessile or stipitate, 1-locular; styles 2, free to base, plumose, long or short. **Fruit** a large woody nutlet with a distinct elaiosome.

Species ± 11, mainly Western Cape, extending to Northern Cape (Namaqualand).

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Ruppiaceae

(Alismatidae—Najadales)

Compiled by R.P. Glen

Perennial, grass-like herbs, completely submerged; forming large colonies in saline or fresh water; with branches up to ± 0.75 m long. **Roots** simple, 1 or 2 per node, densely covered with very long roothairs. **Rhizomes** creeping, branched, thin; internodes angled. **Stems** thin, branching freely. **Leaves** alternate or upper ones opposite, spreading; lamina linear to setaceous, up to 100 mm long and 1 mm broad; stipular sheaths attached to base of lamina, wide, folded, membranous, obtuse at apex, amplexicaul at base. **Inflorescences** at first enclosed in swollen sheaths of apical leaves, consisting of 2 opposite flowers inserted at different heights, and therefore spicate, but appearing subumbellate in fruit because of stipitate drupes; peduncle remaining short in one species, accrescent in the other, becoming

long and spirally coiled. **Flowers** bisexual, small, naked, protandrous, water-pollinated. **Stamens** 2, opposite; separated thecae divergent, with their short filiform connectives attached to short swollen columnar filament; pollen luniform, buoyant. **Gynoecium** of usually 4, occasionally more, free carpels, sessile at first, becoming long-stipitate in fruit; carpels each with a solitary, pendulous, campylotropous ovule; stigma sessile, peltate. **Fruit** a drupelet or nutlet, pyriform, often oblique, beaked, sometimes verruculose, on a stipe 10–30 mm long. **Seed** hard with brown testa; endosperm 0. $x = 10$ (8, 9, 12) (aneuploids, polyploidy).

Monogeneric family, cosmopolitan, mainly in temperate regions; species either ± 7, or 1 or 2 polymorphic ones. This genus has had a confused taxonomic history both at specific and family levels; often included under the Potamogetonaceae (Phillips 1951; Jacobs & Brock 1982, Cook 1990, Brummitt 1992).

Linnaeus: 126 (1753); Bennett: 45 (1897) under Naiadaceae; Obermeyer: 70 (1966) (the basis of this account); Jacobs & Brock: 326 (1982); Dahlgren *et al.*: 312 (1985); Cook: 202 (1990); Brummitt: 743 (1992).

Ruppia L. 0059000

Description as for family.

Species 1 or 2 or ± 7, depending on interpretation; presently 2 are recognised in sthn Afr., but they are perhaps only distinguished by ecological modifications.

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Smilacaceae

(Liliidae—Dioscoreales)

Compiled by N.L. Meyer

Scandent, glabrous, dioecious shrubs (rarely erect) with many tough, perennial prickly stems from a compact rhizome with many roots. **Leaves** alternate, on short petioles, with a pair of spiral tendrils near base of petiole (an extension of leaf sheath); blade with 3–5 strong nerves and reticulate venation between main veins, firm. **Flowers** regular, hypogynous, unisexual, small, in axillary umbels or terminal compound inflorescences. **Tepals** 3 + 3, free, petaloid. **Male flowers** with 6 (–15) free stamens; anthers basifixed, thecae confluent, appearing unithecate; ovary 0. **Female flowers** with 6 filiform staminodes; ovary superior, 3-locular, with 1 or 2 axile ovules; style 0 or short; stigmas 3. **Fruit** a berry. **Seeds** 1–3, globose or semiglobose. $x = 16$ (13, 15, 17) (high polyploidy).

Genera 4; species ± 375, throughout the tropical and subtropical regions of the world and in a few temperate areas; sthn Afr.: genus 1, species 1.

Dahlgren *et al.*: 127 (1985); Obermeyer: 85 (1992).

Smilax L. 1151000

Linnaeus: 1028 (1753); Kunth: 160 (1850); Candolle: 45 (1878); Baker: 256 (1896); Krause: 382 (1930); Hutchinson: 764 (1973); Obermeyer: 85 (1992).

Description as for family.

Species ± 300; 1 in sthn Afr.: *Smilax anceps* Willd., Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal and Eastern Cape.

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Strelitziaceae

(Zingiberidae—Zingiberales)

Compiled by C. Archer

Perennial herbs or banana-like trees with true stems (in contrast to Musaceae which have stems formed by sheathing leaf bases). **Leaves** distichous, sheathing at base, usually large to very large, channelled down face, rarely reduced to a bladeless petiole. **Inflorescence**: peduncles arising from axils of leaves, producing a ± boat-shaped coriaceous bract at apex; bract sheathing a cincinnate inflorescence, sometimes secondary inflorescences produced from axis of first. **Flowers** bisexual, irregular. **Sepals** 3, petaloid, lowest boat-shaped towards base, attenuate above, keeled; laterals attenuate. **Petals** 3, ± free, 2 lower connivent and forming a ± sagittate blade, with a central channel containing stamens and style; third (upper) petal much smaller. **Stamens** 5; anthers 2-thecous, with parallel thecae with longitudinal slits. **Ovary** inferior, 3-locular, with many axile ovules in each locule; style with 3 linear stigmatic branches. **Fruit** a woody, 3-angled, loculicidal capsule. **Seeds** few, globose with a woolly aril. $x = 7, 11$.

Genera 3, species ± 7, tropical America, Madagascar; sthn Afr.: genus 1, species 5.

Wright: 313 (1913) under Scitamineae; Hutchinson: 719 (1973).

Strelitzia Aiton 1319000

Aiton: 285 (1789); Wright: 316 (1913); Dyer: tt. 995, 996, 997 (1946); 575 (1972); Moore & Hyypio: 65 (1970); Dyer: 519 (1975).

Description as for family.

Species 5, Zimbabwe and eastern sthn Afr., Northern Province, Mpumalanga, KwaZulu-Natal to Western Cape near Knysna.

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Tecophilaeaceae

(Liliidae—Asparagales)

Compiled by R.H. Archer

Perennial herbs of varied habit; rootstock a rounded tuber or tunicated corm; stems annual, erect, sometimes prickly, or reduced to an inflorescence with basal leaves. **Leaves** cauline and alternate, or basal, 2–many, distichous or rosulate, deciduous. **Flowers** bisexual, ± regular, in axils of stem leaves or in exserted racemes, bracteate; pedicels usually recurved. **Perianth** segments 3 + 3, free or forming a short tube, spreading, usually pink or yellow, subequal, marcescent. **Stamens** 6, often with 1 or 3 dimorphous, variously coherent, arising on throat of perianth tube or base of segments; filaments often variously fused basally; anthers 2-thecous, basifixed, connective sometimes variously produced, opening by apical, often swollen pores, rarely by slits. **Ovary** half-inferior, or superior, 3-locular, conical above; ovules axile, many, biseriate; style subulate; stigma apical, small. **Fruit** a loculicidal capsule. **Seeds** many, globose or ovoid, usually black.

Genera 6, species ± 25; tropical and sthn Afr., Chile, California; sthn Afr.: genera 2, species ± 10. The generic placement of *Cyanella amboensis* Schinz needs further study (Scott 1991).

Hutchinson: 758 (1973); Dahlgren & Van Wyk: 75 (1988).

Formerly often placed in Haemodoraceae.

Key to genera

Leaves borne on erect or scandent, sometimes prickly stems; flowers axillary; rootstock a tuber ..... **Walleria**

Leaves basal, usually rosulate, rarely 2, opposing; flowers in racemes or rarely solitary; rootstock a corm ..... **Cyanella**

Cyanella L. 1233000

Linnaeus: 443 (1762); Baker: 6 (1896); De Vos: 220 (1950); Scott: 34 (1991).

Geophytes with aerial parts annual; corm deep-seated with long thin neck and fibrous to hard outer tunic, edible. **Leaves** basal, 2–many, opposite or rosulate, linear to ovate-acuminate, forming a tubular sheath below, outer sheaths bladeless, often membranous, ribbed, glabrous, rarely scabrid or ciliate. **Flowers** in simple or much-branched, many-flowered, lax racemes, much exserted from leaf rosettes; rarely axillary, single-flowered on long pedicels, appearing successively, opening in morning and closing in evening, for several days; peduncle terete, wiry, bracteate; pedicels usually curved. **Perianth**: segments free or shortly united at base, spreading-reflexed, erect in bud and in fruit, usually reflexed during anthesis; white, pink, yellow, orange, brown, mauve or blue, occasionally bicoloured, with a purple basal spot or dark centre, veins often distinct; marcescent, circumscissile near base of ovary, falling off together with stamens. **Stamens** unequal or dimorphous, with 1 or 3 differently shaped; filaments short, fused basally, upper ones arched in some species; anthers yellow, sometimes maculate or papillate. **Ovary** half-inferior, conical above. **Capsule** erect, globose to narrowly ovoid, developing mainly above insertion of perianth. **Seeds** many, ovoid with wrinkled surfaces, shiny. $x = 8$ (polyploidy).

Species 7 or 8, sthn Afr., Namibia, mostly Western Cape.

Walleria J.Kirk 1231000

Kirk: 497, t. 52 (1864); Baker: 528 (1897); Hutchinson: 751 & 760 (1973) as Liliaceae and Tecophilaeaceae respectively; Carter: 185 (1962); Sterling: 115 (1974); Dahlgren & Van Wyk: 75 (1988) in Wallerioideae.

Geophyte with a deep-seated potato-like, large, edible tuber with fibrous roots, annually producing a taproot and a single, erect, rarely branched, ridged, usually prickly, leafy stem, up to ± 0.6 m tall. **Leaves** sessile, alternate, linear to lanceolate, successively larger and more foliose upwards, often prickly, apex cirrhose or subulate. **Flowers** axillary, solitary in each axil, pendulous; peduncle long, thin, erect, prickly, with a bract resembling a minute leaf; pedicel recurved. **Perianth** with segments fused basally, spreading-reflexed, white, pink or light blue. **Stamens** 6; filaments short, confluent at base, arising from throat of perianth; anthers connivent, forming a cone. **Ovary** largely superior, globose. **Capsule** (? or berry) subglobose, 3-grooved. **Seeds** rounded-oblong, dark brown, coarsely papillate, papillae bearing small tufts of hairs. $x = 12$.

Species 3, Africa and Madagascar; 2 in sthn Afr., 1 widespread but uncommon, 1 rare in Western Cape.

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Typhaceae

(Commelinidae—Typhales)

Compiled by R.P. Glen

Monoecious, perennial marsh herbs, with creeping rhizomes. **Stems** erect, simple, terminated by dense, cylindrical flower-spikes. **Leaves** mostly radical, distichous, with sheathing base and narrow, linear, parallel-veined lamina. **Inflorescence** a dense spike of closely packed flowers, with male flowers zoned in upper portion, contiguous to or shortly separated from female flowers in lower portion. **Flowers** unisexual, minute, wind-pollinated. **Male flowers** usually subtended by variously shaped scales or bracteoles; perianth 0(3–6) small scales; stamens 2–5; filaments free or variously connate; anthers linear, basifixed, with broad connective prolonged beyond pollen sacs. **Female flowers** ebracteolate or with slender, clavate or spathulate bracteoles, abortive clavate female flowers (carpodia) often produced; perianth of several fine, persistent, filiform or clavate hairs; ovary superior, often stalked, fusiform, unilocular with a solitary pendulous ovule; style elongated, slender; stigma linear or lanceolate. **Fruit** 1-seeded, minute, ellipsoid or subcylindrical, with slender stipe with many hairs which aid wind-dispersal. **Seeds** with a striate testa and copious mealy endosperm. $x = 15$.

Monogeneric family, species cosmopolitan; sthn Afr.: species 2.

Brown: 31 (1897); Anderson: 53 (1966); Napper: 1 (1971); Smith: 129 (1987).

Typha L. 0049000

Linnaeus: 971 (1753); Brown: 31 (1897); Smith: 129 (1987); Anderson: 53 (1966); Napper: 1 (1971); Cook: 220 (1990).

Description as for family.

Species ± 8 to 13, cosmopolitan, found in a wide variety of aquatic habitats; 2 in sthn Afr.: *Typha capensis* (Rohrb.) N.E.Br., widespread, *T. domingensis* Pers. only in Botswana.

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Velloziaceae

(Liliidae—Liliales)

Compiled by R.H. Archer

Fibrous perennials; stems dwarf and tufted, or sparsely branched, up to about 4 m tall, protected by noninflammable leaf bases. **Leaves** in tufts at ends of branches, narrow, ± persistent or blade eventually falling from sheath. **Flowers** bisexual, regular, solitary or few between fascicles of leaves. **Perianth**: segments 3 + 3, petaloid, spreading, forming a very short or obsolete tube. **Stamens** 6; anthers 2-thecous, linear, basifixed or dorsifixed, opening by longitudinal slits. **Ovary** inferior, 3-locular, with many ovules in each locule on axile placentas; style simple; stigma subcylindric or capitate. **Fruit** a capsule, often flat or concave on top and crowned with scar of perianth, or 6-toothed, sometimes spiny, loculicidally dehiscent; seeds black.

Genera 6, species ± 80; Africa, Madagascar and South America; in sthn Afr.: genera 2, species 10.

Smith & Ayensu: 181 (1974).

Key to genera

Ovary 3-angled, without multicellular hairs; style elongate; stigma capitate; anthers basifixed; leaves persistent, with several long, normal leaves alternating with several bract-like leaves ..... **Talbotia**

Ovary ± round in cross section, hairy or spiny, with multicellular hairs; style simple, short; stigma columnar; anthers dorsifixed; leaves with transverse abscission band towards base ..... **Xerophyta**

Talbotia Balf. 1247020

Balfour: 192 (1867); Coetzee *et al.*: 3 (1973); Smith & Ayensu: 183 (1974).

Vellozia in sense of Baker: 245 (1896) in part; Hilliard & Burtt: 32 (1971).

Fibrous perennials, branched from base with branches up to about 150 mm long, unbranched above. **Leaves** ± persistent, tristichous, sheathing at base, spreading-recurved, linear-lanceolate, 100–200 mm long, sharply keeled and serrated towards apex, interspersed along stems with series of sheathing, bract-like leaves. **Flowers** single on terminal, thin, subpersistent peduncles 50–150 mm long. **Perianth** 20–30 mm in diameter, pale lilac to white, turning green on ageing. **Stamens** erect; anthers subsessile, linear, basifixed. **Ovary** 3-angled, without multicellular hairs, obovoid, with many ovules on 2 thick placentas in each locule; style elongate; stigma capitate. **Fruit** sharply 3-angled. **Seeds** sausage-shaped, on thickened funicle.

Species 1: *Talbotia elegans* Balf., Mpumalanga and KwaZulu-Natal.

Xerophyta Juss. 1247010

Jussieu: 50 (1789); Baker: 231 (1875); Sölch: 1 (1969); Coetzee *et al.*: 3 (1973); Coetzee: 19 (1974); Smith & Ayensu: 184 (1974).

Vellozia in sense of Baker: 244 (1896).

Fibrous perennials; stems dwarf and tufted or sparsely branched, up to ± 4 m tall, protected by dense leaf bases, with roots passing down stem within leaf bases. **Leaves** mostly with transverse abscission band towards base and apical part falling with age. **Flowers** solitary on each peduncle, sometimes few between fascicles of leaves. **Perianth** with very short tube, or divided to top of ovary. **Stamens**: filaments short; anthers dorsifixed. **Ovary** ± round in cross section, spiny, or with multicellular hairs; with many ovules in each locule on projecting placentas; style simple, short; stigma columnar. **Fruit** often flat or concave on top. **Seeds** attenuate-turbinate, angled, many. $x = 12$ (polyploidy).

Species ± 30–40; 9 in sthn Afr., widespread.

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Xyridaceae

(Commelinidae—Commelinales)

Compiled by R.P. Glen

Perennial, rarely annual, tufted, grass-like, usually marsh herbs, with a compact, erect rhizome (occasionally subbulbous in dry situations), usually gregarious. **Leaves** radical, spirally arranged, narrowly ensiform, linear, terete or filiform, sheathing at base. **Inflorescence** spicate, formed of tough bracts in an ovoid head terminating a long naked scape with a basal sheath. **Flowers** bisexual, slightly irregular, 3-merous, fugaceous; scapes rarely with 1 or 2 pairs of sheathing bracts above; bracts glumaceous, spirally imbricate, bearing a solitary flower in its axil, the lower in some species leafy, forming an involucre. **Sepals** 3, 2 lateral exterior, boat-shaped, glumaceous, third interior, membranous, forming a hood over the corolla in bud, circumscissile at base and deciduous at anthesis. **Corolla**: lobes 3, regular, spreading, tubular below, with 3 slits; yellow, rarely white or blue. **Stamens** 3, arising from corolla throat opposite lobes; anthers 2-thecous, dorsifixed, extrorse, opening lengthwise; staminodes 0–3, alternating with corolla lobes, modified, entire or 2–4-furcate, glabrous or variously plumose. **Ovary** superior, 1-locular, with 3 parietal placentas or incompletely or completely 3-locular, with basal or axile placentas; ovules few–many; style simple, filiform, rarely with processes at or below middle, 3-fid or entire; stigmas dilated or filiform, oblique. **Fruit** a 3-valvate loculicidal capsule enclosed in persistent corolla and sepals. **Seeds** many, minute, spindle-shaped or globose, often with longitudinal moniliform ribs; embryo small, apical, surrounded by copious endosperm. $x = 9$ (13) (aneuploids).

Genera 5, species 260, 2 genera with aquatic species, mainly in tropical and subtropical areas of America, Australia, Asia and Africa; sthn Afr.: genus 1, species 7.

Brown: 2 (1897); Roessler: 1 (1967); Dahlgren *et al.*: 388 (1985); Obermeyer: 1 (1985); Cook: 220 (1990).

Xyris L. 0826000

Linnaeus: 42 (1753); Roessler: 1 (1967); Obermeyer: 1 (1985).

Description as for family.

Species 250, most in North and South America, fewer in Australia, Asia and Africa; 7 in sthn Afr., widely distributed except in Northern Cape, growing in marshes or seepage areas.

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Zannichelliaceae

(Alismatidae—Alismatales)

Compiled by R.P. Glen

Submerged annual or occasionally perennial herbs of fresh or brackish water, monoecious or dioecious, with leafy stems permanent or deciduous. **Roots** adventitious, unbranched, appearing from an annular skinfold at rhizome nodes. **Rhizomes** creeping, matted, bracteate. **Leaves** alternate or opposite, often apparently distichous or 3(4) in pseudowhorls (*Zannichellia*); plane of distichy often changing from parent to branch axis; leaves linear, 1- (or ± 3)-veined or reduced to membranous, biseriate scale leaves without vascular tissue, sometimes with fibres; foliage leaves in all genera, except *Zannichellia*, with a basal, membranous and sometimes fibrous, open but overwrapping sheath extended distally beyond insertion of blade as an auriculate ligule; apex rounded, pointed or sometimes truncate, 3-toothed, or dentate; those of upper fertile leaves modified into bracts with lamina reduced or wanting. **Flowers** unisexual, solitary or in sympodial axillary clusters; 'perianth' 0 or present, flask-shaped or rarely of 3 small scales. **Male flowers** with 2 (rarely 1 or 3) united anthers, 4-, 2- or 1-thecous (8-, 4- or 2-sporangiate), with an apical appendage and 1 or more longitudinal slits; filament (or pedicel) lengthening rapidly at anthesis; pollen globose or filamentous, pollination hydrophilous. **Female flowers**: carpels 1, 3–5(–9), free; style long or short, simple; stigma capitate, peltate, funnel-shaped, or 2–4-lobed; ovule solitary, pendulous, anatropous, bitegmic. **Fruit** a drupelet. **Seeds** with cotyledon spirally coiled; endosperm 0.

Genera 4, species ± 10, cosmopolitan; sthn Afr.: genera 3, species 3–5.

Obermeyer: 73 (1966); Cook: 222 (1990).

Key to genera

1a Distal leaves in pseudowhorls, basal leaf sheaths (or stipules) free from leaf; fruit with spiny or warty ridge or ridges; rhizome creeping, not well differentiated ..... **Zannichellia**

1b Distal leaves distichous, never pseudowhorled, with an attached sheathing base; fruit smooth or warty, never ridged; rhizome creeping, sympodial, well differentiated:

2a Leaf blade up to 2 mm wide with submarginal vascular strands and oblique transverse strands continuous with midvein; male flowers naked, 8-sporangiate with a pair of vestigial appendages on the connective; female flowers always 1-carpellate, with a membranous envelope; fruit uniformly warty..... **Pseudalthenia**

2b Leaf blade less than 2 mm wide, with a single midvein; male flowers with short, 3-lobed perianth immediately below anther, 2–12-sporangiate; female flowers (1–)3-carpellate, each carpel subtended by a separate tepal; fruit smooth.... ..... **Althenia**

Althenia F.Petit 0063000

Petit: 451 (1829); Obermeyer: 79 (1966); Cook: 222 (1990).

Small, creeping, coastal, submerged annuals. **Roots** 4–7 from a node, simple, long, densely covered with long root-hairs. **Rhizome** branched, slender, with a deciduous, lanceolate, amplexicaul scale from each node. **Stems** simple, erect, up to 150 mm long, filiform. **Leaves** usually aggregated above, filiform-setaceous, up to 50 mm long; sheaths folded, membranous, about 5 mm long, forming a forked appendage above, 2–3 mm long, becoming frayed with age. **Flowers** in clusters. **Male flowers** solitary, on a pedicel which elongates up to 4–5 mm during anthesis so that anther is just exserted, often with 3, as yet undeveloped, female flowers beside them; perianth a small 3-toothed cup, with the 1-thecous anther sessile or subsessile; pollen globose. **Female flowers** usually 3 together; (1–)3-carpellate; carpels stipitate, each enfolded in a membranous bract, narrow-ovoid, unilocular, with long style and saucer-shaped apical stigma. **Fruit** a stipitate, cylindrical, slightly oblique, smooth drupelet crowned with persistent, pin-like style and stigma base.

Species 3, or 1 polymorphic species: *Althenia filiformis* F.Petit, Mediterranean coast, Atlantic coast of Morocco, Portugal, Spain, France, Asia Minor, central Siberia and the coastal waters of Namibia and South Africa as far as Port Elizabeth (Eastern Cape).

Pseudalthenia Nakai 0062010

Nakai: 213 (1943); Den Hartog: 95 (1980); Cook: 222 (1990).

Vleisia Toml. & Posl.: 273 (1976).

Submerged annuals with slender rhizomes. **Stems** upright, usually unbranched. **Leaves** alternate, leaf blade flattened, linear up to 100 mm long and 2 mm wide, with submarginal fibrous strands and submarginal veins connected to midvein by obliquely extended commissures; sheathing base auriculate. **Male flowers** single, naked; stamen with 8 microsporangia, connective terminating in a blunt appendage and with two vestigial outgrowths opposite each other on connective, hidden by anther lobes at maturity. **Female flowers** borne in a tubular sheath; carpel solitary; style lengthens rapidly during anthesis and displays a large, ephemeral, obliquely funnel-shaped stigma. **Fruit** an asymmetrical, warty, bean-shaped drupelet.

Species 1: *Pseudalthenia aschersoniana* (Graebn.) Hartog, endemic to the W Western Cape; in brackish, coastal pools near Lamberts Bay and south to the Cape Peninsula.

Zannichellia L. 0062000

Linnaeus: 969 (1753); Bennett: 50 (1897); Obermeyer: 77 (1966); Cook: 222 (1990).

Submerged annuals, occasionally perennating, monoecious. **Roots** 1–3 per node, simple, densely covered with long roothairs, penetrating substratum spirally. **Rhizome** creeping, matted, sympodial. **Stems** simple or sparsely branched, erect. **Leaves** ternate, opposite or alternate, linear, sessile, with a free cupular sheath subtending axils, or leafbase expanded into a folded sheath forming auriculate stipules above; axillary scales 2, minute. **Flowers** unisexual, solitary, or with a collateral vegetative bud or one of opposite sex beside it. **Male flowers** ephemeral, on long filaments (pedicels); anthers 4- or 8-sporangiate, with an apical knob; pollen globose, copious. **Female flowers** surrounded by a spathe, solitary or pseudo-umbellate; carpels (1–)4 or 5(–9), surrounded by

a closely appressed flask-shaped 'perianth'; style exserted, tubular; stigma spoon- or funnel-shaped, large, with wavy membranous margins, ephemeral; ovule pendulous. **Fruit** a somewhat bean-shaped drupelet, stipitate and crowned with persistent style, pectinate on dorsal and occasionally on ventral side. **Seed** with a long, spirally coiled hypocotyl. $x = 6$ (7, 8) (polyploidy).

Species ± 6 or 1 polymorphic species: *Zannichellia palustris* L., cosmopolitan, throughout sthn Afr. in brackish pans in arid areas and in estuaries and lagoons.

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Zingiberaceae

(Zingiberidae—Zingiberales)

Compiled by C. Archer

Perennial herbs, usually aromatic, with horizontal tuberous rhizomes. **Stems** erect, sometimes short, leafy or sometimes producing only flowers. **Leaves** in 2 rows, with open or closed sheath at base, sessile or with a pseudo-petiole; lamina usually large, with nerves closely parallel, diverging obliquely from midrib; ligule usually present at junction of blade and sheath. **Flowers** mostly bisexual and irregular, solitary in axils of bracts or in cincinni, with or without bracteoles, accompanying or separate from leaves. **Perianth** 6-merous, 2-seriate; outer 3 (calyx) tubular; inner 3 (petals) tubular; often very showy, with a 2- or 3-lobed labellum (lip, formed by staminode). **Stamen** 1, with 2-thecous anther; 3 ± conspicuous petaloid staminodes are present. **Ovary** inferior, 3(2)-locular, usually many-ovuled, with axile placentas, or 1-locular, with parietal or rarely basal placentas; style terminal, undivided, free or ± enveloped in groove of fertile stamen or sometimes 2-lipped, or -dentate; epigynous glands (stylodes) forming erect outgrowths on top of ovary. **Fruit** fleshy and indehiscent, or loculicidally 3-valved. **Seeds** round or angular, mostly covered with large, divided aril.

Genera ± 50, species ± 1000, ± cosmopolitan in tropics, mostly Asian; sthn Afr.: genera 3 (2 exotic), species 6 (4 exotic).

Wright: 313 (1913); Hutchinson: 721 (1973); Lock: 1 (1985); Smith: 35 (1998).

Key to genera

1a Inflorescence borne separately from leaf shoot; flowers purple-pink, blotched with yellow in centre of labellum, sometimes unisexual ..... **Siphonochilus**

1b Inflorescence terminal on leaf shoot; flowers yellow and white or red and yellow, bisexual:

2a Inflorescence erect; corolla tube 50–90 mm long, slender; lateral staminodes petaloid ..... ***Hedychium**

2b Inflorescence pendulous; corolla tube shorter than 20 mm; lateral staminodes reduced to small subulate teeth ..... ***Alpinia**

*Alpinia Roxb. 1353000

Roxburgh: 350 (1810) name conserved; Smith: 38 (1998).

Large perennials 2–4 m tall. **Stems** long-lived. **Leaves** sessile or shortly petiolate, lanceolate, sheathing; margins pubescent. **Inflorescence** terminal, pendulous, cincinnate; axis pubescent; bracts absent; bracteole enfolding bud, soon deciduous. **Flowers** bisexual, usually in pairs; corolla tube shorter than calyx; labellum large and showy. **Stamen**: anther large; lateral staminodes small, slender. **Stigma** large, funnel-shaped. **Ovary** pubescent, 3-locular; placentation axile; epigynous glands erect, tooth-like. **Fruit** capsular, usually spherical. $x = 12$.

Species ± 200, mainly southeast Asia; 1 species: **Alpinia zerumbet* (Pers.) B.L.Burtt & R.M.Sm. (Shell ginger) naturalised in sthn Afr. in Hluhluwe area, KwaZulu-Natal.

*Hedychium J.König 1324000

König: 61 (1783); Smith: 38 (1998).

Perennial herbs, up to 3 m high. **Inflorescence** terminal, erect. **Flowers** bisexual, 1–6 per bract, each subtended by a tubular bracteole. **Corolla** tube long, slender, usually exceeding calyx; petals strap-shaped; labellum narrowed at base with conspicuous, usually bilobed limb. **Stamen** with long, slender filaments; lateral staminodes petaloid. **Ovary** 3-locular; placentation axile. **Fruit** globose or oblong. $x = 17$ (aneuploids).

Species ± 45, Asian; 3 naturalised in sthn Afr., near coast in KwaZulu-Natal.

Siphonochilus J.M.Wood & Franks 1329010

Wood & Franks: t. 560 (1911a); 274 (1911b); Smith: 35 (1998).

Kaempferia L.: 2 (1753); Wright: 313 (1913) in part.

Perennial herbs with aromatic rhizomes. **Stems** annual, usually short. **Leaves** oblong to lanceolate, usually with long sheaths. **Flowers** bisexual, rarely unisexual, borne separately from leaves, sometimes precocious, solitary or in spikes or heads, usually large, pedicelled or subsessile; bracts lanceolate to oblong; bracteoles absent. **Calyx** tube split down one side, membranous. **Corolla** lobes lanceolate to linear; labellum 2-lobed. **Stamen**: filament broad, flat, short; anther linear, connective produced above into a toothed petaloid appendage; lateral staminodes conspicuous, usually longer than corolla lobes, free or united to lip. **Ovary** 3-locular, with many ovules per locule; style filiform; stigma funnel-shaped; epigynous glands erect, short, stub-like. **Fruit** capsular. **Seeds** arillate. $x = 11$ (aneuploids, polyploidy).

Species ± 20, Africa; 2 in sthn Afr.: *Siphonochilus kirkii* (Hook.f.) Baker in Caprivi, Namibia, and *S. aethiopicus* (Schweinf.) B.L.Burtt in Northern Province, Mpumalanga, Swaziland, KwaZulu-Natal to Eastern Cape (largely extinct and possibly introduced in latter three areas fide Williams *et al.*: 28 (1996)).

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Zosteraceae

(Alismatidae—Alismatales)

Compiled by R.P. Glen

Marine perennials, monoecious, completely submerged; with creeping, much-branched, compressed, orange-brown rhizomes; with several simple roots with long roothairs at nodes. **Stems**, if present, floriferous, annual. **Leaves** alternate, distichous, grass-like, parallel-veined, sheathing at base; sheath tubular or convolute, with a small biauriculate ligule; lamina linear, striate, apex rounded, 2-lobed or emarginate, axillary scales 4 or 2. **Inflorescences** forming erect annual sympodial branches, each terminating in a 'fertile' leaf, enclosing in its sheath a unilateral spadix on which male and female flowers are arranged alternately in 2 rows, with or without marginal bract-like infolded lobes or 'retinacula' (interpreted by some botanists as a reduced perianth). **Male flower** a solitary, sessile, unilocular, dorsifixed anther; pollen filiform, with same density as seawater, captured by stigmas. **Female flower** consisting of a superior, unilocular, 1-ovuled ovary terminating in a short style and 2 long stigmatic branches, protogynous (stigmas protruding from sheath during anthesis); ovule pendulous, orthotropous, bitegmic. **Fruit** an indehiscent, or irregularly dehiscent nut, graniform, smooth or longitudinally striped or ribbed. **Seed**: endosperm 0. $x = 6$ (polyploidy).

Bennett: 41 (1897) under Naiadaceae; Phillips: 53 (1951) under Potamogetonaceae; Obermeyer: 57 (1966); Den Hartog: 42 (1970); Cook: 222 (1990).

Genera 3, species 18, in marine and brackish water, often forming extensive beds along the coasts of the temperate seas of the northern and southern hemispheres, a few species extend into tropical waters; sthn Afr.: genus 1, species 1.

Zostera L. 0055000

Linnaeus: 968 (1753); Bennett: 50 (1897); Obermeyer: 58 (1966); Den Hartog: 42 (1970); Cook: 224 (1990).

Description as for family.

Species 12, mostly marine but sometimes in brackish water, cosmopolitan in warm and temperate areas; 1 in sthn Afr.: *Zostera capensis* Setch., widely distributed from Saldanha Bay on the west coast, around the Cape, along the east coast extending as far as Kenya and Madagascar, occurring in marine pools and lagoons.

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GLOSSARY

This list is based on the glossary in Retief & Herman (1997, Plants of the northern provinces of South Africa: keys and diagnostic characters. *Strelitzia* 6) which was compiled mainly from Jackson (1928, *A glossary of botanic terms*, edn 4); Exell & Wild (1960, *Flora zambesiaca* 1,1: 42–54); Radford *et al.* (1974, *Vascular plant systematics*) and Little & Jones (1980, *A dictionary of botany*). Much additional material was gained, chiefly from Orchard (1999, *Species plantarum: Flora of the world. Introduction to the series*).

Abbreviations: *adj.*, adjective; *pl.*, plural; *sing.*, singular; *syn.*, synonym; *vb.*, verb.

A

a- (*prefix*): without, lacking.

abaxial: applied to the side or surface facing away from the axis or stem (compare **adaxial**).

abortion: suppression of parts which are usually present.

abscission: the normal shedding from a plant of an organ that is mature or aged.

acarodomatium (*pl.* **acarodomatia**): a small cavity of very varying form, found on almost any vegetative part of the plant, which is inhabited, or thought to be inhabited, by mites; commonest types are small pockets or pits in axils of main veins with midrib on lower leaf surface.

acaulescent/acauline: stemless or seemingly so.

accrescent: increasing in size, e.g. the calyx of some plants in the fruiting stage.

accumbent: lying against, as the **cotyledons** (in some Brassicaceae) with their edges against the **radicle**.

achene: a small dry fruit, not splitting when ripe, formed from a **superior** ovary of one **carpel** and containing a single seed, with the seed coat free from the fruit wall, as in *Clematis* (Ranunculaceae) (compare **cypsela**).

acicular: very narrow, stiff and pointed, needle-like.

acinaciform: scimitar-shaped; shaped like a short, curved, single-edged sword.

acropetal: arising or developing in a longitudinal sequence towards the apex.

actinomorphic: applied to flowers which are radially symmetrical, i.e. capable of being bisected into similar halves in more than one vertical plane, forming mirror images (= **regular**) (compare **irregular**, **zygomorphic**).

aculeate: armed with **prickles**, as distinct from **spines**.

aculeolate: with small **prickles**.

acumen: a long, tapering point.

acuminate: having a long, slender, sharp point with a terminal angle less than 45°, with margins straight to convex.

acute: sharp-pointed, with a terminal angle between 45° and 90° with margins straight to convex.

adaxial: applied to the side facing the stem or axis (compare **abaxial**).

adnate: fused to an organ of a different kind, e.g. an ovary to the calyx tube.

adpressed: see **appressed**.

adventitious: applied to plant organs produced in an unusual or irregular position or at an unusual time of development, as in adventitious buds, roots or shoots.

adventive: introduced recently by chance to an area (compare **introduced**, **naturalised**).

aerenchyma (*adj.* **aerenchymatous**): tissue of thin-walled cells and large intercellular spaces, found especially in water- and marsh plants.

aestivation: the manner in which sepals and petals are arranged in a bud (compare **vernation**).

aggregate fruit: a cluster of fruits formed from the free **carpels** of one flower, e.g. the many small **drupes** in the 'fruit'of *Rubus* (Rosaceae) (compare **syncarp**).

alate: **winged**, as in certain stems or seeds; having wing-like extensions.

albumen (*adj.* **albuminous**): starchy or other nutritive material within the embryo; an older term largely replaced by the term **endosperm**.

allopatric (of two or more taxa): having different ranges of distribution (compare **sympatric**).

alternate: applied to leaves and other organs inserted singly at different levels along the axis.

alternipetalous: applied to floral parts arising alternately with the petals.

alternisepalous: applied to floral parts arising alternately with the sepals.

alveola (*pl.* **alveolae**): small pits on the surface, as on the receptacle of many of the Asteraceae (see **alveolate**).

alveolate: honeycombed; having deep angular sides, like the cavities of a honeycomb.

amphistomatic/amphistomatous: with stomata on both upper and lower leaf surfaces.

amphitropous ovule: an ovule which is attached near its middle and is bent in the form of a U, so that the ovule tip and stalk base are near each other.

amplexicaul: stem-clasping, as when the base of the leaf is dilated and embraces the stem.

ampullaceous: swollen out in flask-shape.

anacampylotropous: applied to an **ovule** intermediate in structure between **anatropous** and **campylotropous**.

anantherous: of a filament without anther.

anastomosis (*vb.* **anastomose**): union of one vein with another, the connections forming a network.

anatropous: applied to an **ovule** that is inverted, so that the funicle is basally attached near the adjoining **micropyle** area, and the **chalaza** is at the opposite end.

ancipitous/ancipital: two-edged; flattened or compressed, as in stems of certain Poaceae.

androecium: the **stamens** and accessories of one flower.

androgynophore: a stalk supporting both **androecium** and **gynoecium** of a flower above the level of insertion of the **perianth**.

androphore: a stalk bearing the **androecium**.

andropodium: the structure on which the stamens arise (in some Podostemaceae).

anemochoric: dispersed by wind.

anemophilous: pollinated or dispersed by wind (compare **entomophilous**, **hydrophilous**, **ornithophilous**).

aneuploid: having a chromosome number that is not an exact multiple of the **haploid** number, because one chromosome set is incomplete.

angiosperm: a seed-bearing plant whose ovules, and hence seeds, develop within an ovary (compare **gymnosperm**).

angustiseptate: with narrow partitions (compare **latiseptate**).
anisocytic: of a **stoma** with three subsidiary cells, one distinctly smaller than the other two, surrounding the stoma.
anisophyllous: with the two leaves of a pair of unequal size or shape.
annual: a plant whose life span ends within one year after germination.
annular: arranged in a circle.
annulate: ring-shaped; having an **annulus**.
annulus: any ring or ring-like structure.
anomocytic: of a **stoma** surrounded by a limited number of cells that are indistinguishable from those of the remainder of the epidermis.
antepetalous (e.g. of **stamens**): **opposite** the petals.
antesepalous (e.g. of **stamens**): **opposite** the sepals.
anterior (applied to floral organs): in a position most remote from the axis (compare **posterior/posticous**).
anthela (*adj.* **anthelate**): a **panicle** in which the lateral axes overtop the main axis.
anther: the part of the stamen which contains the pollen, usually comprising four **microsporangia** or **pollen sacs**, two in each half or lobe of the anther; the tissue separating the two sacs in each half usually disintegrates before **anthesis**, resulting in a 2-thecous/bithecous/2-locular/2-celled anther.
anther canal (in orchids): the narrow **basal** portion of a **pollinium**.
antherode: a sterile anther, often rudimentary.
anther slits: see **gynostegial grooves**.
anther wings (in Asclepiadoideae—Apocynaceae): see **gynostegial grooves**.
anthesis: period during which the flower is open.
anthocarp: a false fruit formed by the union of floral parts with the fruit (as in Nyctaginaceae).
anthophore: a short stalk between calyx and petals (e.g. in *Dianthus*—Caryophyllaceae).
anticous/antical: applied to that which is most remote or turned away from the axis; occasionally employed for **introrse**, as applied to anthers (compare **posticous**).
antrorse: bent or directed towards the apex or forward (compare **retrorse**).
apex (*pl.* **apices**): tip; topmost part or terminal end.
aphlebia: stipular outgrowths which occur on the **rachis**.
apicule/apiculum/apiculus (*adj.* **apiculate**): a short point.
apocarpous: with **carpels** free from one another.
apophysis (*pl.* **apophyses**): the rounded, exposed thickening on the scales of certain pine cones.
apotropous: of an **anatropous** ovule with ventral **raphe**.
appendiculate/appendaged: with small appendages; hanging in small fragments.
appressed: lying close to and flat along the surface.
aquatic: living in water.
arachnoid: cobwebby by soft and fine entangled hairs which are longer than in **tomentose**.
araneose/araneous: see **arachnoid**.
arborescent: having the shape or characteristic of a tree.
arcuate: curved like a bow.
areolate: divided into distinct spaces.
areole: a small pit or raised spot, often bearing a tuft of hairs or spines; a space marked out on a surface; a small area in a leaf between small veins.
aril: an appendage covering or partly enclosing the seed and arising from the **funicle** (stalk) of the seed.
arillode: a false **aril**; a fleshy coat derived from the orifice or **micropylar** rim of the outer **integument** instead of the stalk of an ovule.
arillus (*pl.* **arilli**; *adj.* **arillate**): see **aril**.
arista (*pl.* **aristae**): a bristle-like appendage as on **glumes** of many Poaceae; a bristly **awn**.
aristate: with a long, bristle-like point.
article: one of the segments of a jointed fruit, such as a **loment**, or **internodes** of the branchlets of e.g. *Casuarinaceae or Salicornieae—Chenopodiaceae.
articulate(d): jointed or separating at a certain point and leaving a clean scar.
articulation: a joint, e.g. between the **column** and the lower part of the **lemma** in *Aristida* (Poaceae).
ascendent/ascending: growing erect after an oblique or ± horizontal beginning.
ascending (of **aestivation**): sepals or petals arranged in the bud so that the upper margins of the lowest member overlap the lower margin of the member above it.
asperous: rough, harsh to the touch.
asperulate/asperulous: slightly rough to the touch.
ategmic (of a seed): without covering.
atrocastaneous: dark chestnut-coloured; dark brown.
attenuate: tapering gradually.
aulacospermous (of seeds): furrowed.
auricle (*adj.* **auricled/auriculate**): an ear-like lobe or appendage at the base of a leaf or other organ.
autogamous: self-fertilising.
awn: a fine bristle usually terminating an organ, as at the tip of the **glumes** and **lemmas** of many Poaceae.
axil: the angle between leaf or bract and the axis bearing it.
axile placentation: **placentation** with the **ovules** borne on the axis or the inner angle of the locules of a **syncarpous** ovary (see also **marginal** and **parietal placentation**).
axillary: arising from the **axil**.
axis (of an inflorescence): that part of the stem or branch on which the individual flowers are borne.

B

baccate: berry-like.
barbate: bearded.
barbed: with rigid points or lateral bristles pointing backwards.
barbellate: shortly **barbed**.
basal: at the base.
basifixed: fixed by its base, e.g. of an anther (compare **dorsifixed**, **medifixed**, **versatile**).
basiscopic: toward the **basal** or **proximal** (as opposed to **distal**) end; facing basally.
B-chromosomes (accessory chromosomes): supernumery chromosomes occurring in addition to the normal **diploid** complement.
beak: a prominent terminal projection, especially of a **carpel** or fruit; a slight narrowing of the **lemma** below the **awns**, as distinct from a longer straight **column**, e.g. in *Aristida* (Poaceae).
bearded: with long awns or with tufts of stiff hairs.
berry: a juicy fruit with soft **pericarp**, the seeds immersed in pulp (compare **drupe**, **pyrene**).
bi- (*prefix*): twice; two; having two.
bicallose: with two **callosities**.
bicarpellate (of an ovary): with two carpels.
bicolorous: two-coloured.
bifacial (of a leaf): **dorsiventral**, having a distinct upper and lower surface.
bifarious(ly): see **distichous**.
bifid: cleft into two parts for ± half the length.

bifoliate: having two leaves.
bifoliolate: having two **leaflets**.
bilabiate: 2-lipped, as when two or three lobes of a calyx or corolla stand separate as an upper lip from the others forming a lower lip.
bilocular: with two **locules** or compartments.
binate: in pairs.
bipinnate: when the primary divisions (pinnae) of a **pinnate** leaf are themselves pinnate.
biramous: with two branches.
biseriate: arranged in two rows or **whorls**.
bisexual: having both sexes in the same **flower** or **inflorescence**.
bitegmic: of an ovule having two **integuments**.
biternate (of a leaf): with two orders of leaflets, each **ternately** compound.
bithecate (of an anther): with two **thecae**.
bivalved: having two **valves**.
blade: the expanded part of a leaf or petal (see also **lamina**, **limb**).
bothrospermous (of seeds): pitted.
botryoid: like a cluster of grapes.
brachyblast: a **spur shoot** or short branch.
bract: a leaf-like structure, different in form from the foliage leaves and without an axillary bud, associated with an **inflorescence** or a **flower**.
bracteal cup: cup-shaped structure formed by fused bracts (e.g. in Viscaceae).
bracteate: possessing or bearing **bracts**.
bracteole (*adj.* **bracteolate**): small bract borne on the **pedicel** or **calyx** of a flower.
bractiform: looking like a **bract**.
bristle: a stiff, strong **trichome**, similar to a pig's bristle, as in the **perianth** of some Cyperaceae.
brochidodromous (of a leaf): with a single primary vein, the secondary veins not terminating at the margin but joined together in a series of prominent upward arches or marginal loops on each side of the primary vein.
bud: an undeveloped shoot that can give rise to a branch or flower.
bulb: a storage organ, usually underground, made up of a usually much abbreviated stem and fleshy leaf bases.
bulbil: a small deciduous **bulb** (or **tuber**) formed around the mother bulb or in the **axil** of a leaf, and functioning to propagate the plant vegetatively.
bulbous-based: with an inflated base.
bullate: having a blistered or puckered surface; (of a leaf surface): prominently raised, like a bubble, between the veins.
bur(r): a rough or prickly **propagule** consisting of a seed or fruit and associated floral parts or bracts.
buttress: a flange of tissue protruding from the base of the main trunk of a tree.

C

caducous: falling off early.
caespitose: growing in tufts.
calcarate: having a spur.
calceiform: shaped like a slipper.
callose/callous: hard and thick in texture; bearing **callosities**.
callosity: a leathery or hard thickening of part of an organ.
callus (*pl.* **calli**): a thickened part, such as the thickened extension at the base of the **lemma** at the point of its attachment to the **rachilla**.
calycine: belonging to the **calyx**.
calyculus (*pl.* **calyculi**; *adj.* **calyculate**): the bracts around the **calyx** or an **involucre** resembling an outer calyx (see also **epicalyx**).
calyx (*pl.* **calyces**): the outer envelope of the flower, consisting of free or united **sepals**.
calyx tube: when the **sepals** are partly united, the lower portion is referred to as the tube and the upper free part as the **limb** usually divided into calyx teeth, lobes or segments (see also **hypanthium**).
campanulate: bell-shaped.
campylotropous: of an **ovule** orientated transversely (i.e. with its axis at right angles to its stalk and with a curved **embryo sac**).
canaliculate: channelled.
canescent: ± grey-pubescent or hoary.
cano- (*prefix*): greyish white (usually applied to hair covering).
capillary: resembling a hair; very slender.
capitate: (1) like the head of a pin, as the **stigma** of some flowers; (2) collected into compact head-like clusters, as the inflorescences of Asteraceae.
capituliform: shaped like a **capitulum**.
capitulum (*pl.* **capitula**): a dense head-like inflorescence usually of sessile flowers (see also **head**).
capsule: a dry fruit composed of two or more united **carpels** and either splitting when ripe into flaps called **valves** or opening by slits or pores.
carina (*adj.* **carinal**): a keel; the two partially united **anterior** (lowest) petals of a **papilionaceous** flower, or the single, similar-shaped, anterior petal in many Polygalaceae.
carinate: keeled.
carnose: fleshy.
carpel: an organ (generally believed to be a modified foliar unit) at the centre of a flower, bearing one or more **ovules** and having its margins fused together or fused with other carpels to enclose the ovule(s) in an **ovary**, and consisting also of a **stigma** and usually a **style** (see also **suture**).
carpellate: possessing **carpels**.
carpophore: the stalk of a **carpel** or of a **mericarp**.
carrier: see **corpuscle**.
carpopodium: the stalk of a fruit.
cartilaginous: hard and tough, as the skin of an apple-pip.
caruncle (*adj.* **caruncular/carunculate**): an outgrowth from **integuments** at or near the **hilum** of certain seeds (see also **strophiole**).
caryopsis: a 1-seeded, dry, indehiscent fruit with the seedcoat adnate to the fruit wall, derived from a 1-loculed **superior ovary** (characteristic of Poaceae) (compare **achene**).
castaneous: chestnut-coloured; dark brown.
cataphyll: small scale leaf, e.g. on **rhizomes** of flowering plants.
catkin: a dense, often pendulous **spike** of small unisexual flowers which have no conspicuous **perianth**.
caudate: abruptly ending in a long tail-like tip or appendage.
caudex: a short, thickened, often woody, vertical or branched perennial stem, usually subterranean or at ground level (e.g. in some spp. of *Encephalartos*—Zamiaceae).
caudicle: the stalk of a **pollen mass** connecting it to the **corpuscle**, in Asclepiadaceae and Orchidaceae (also known as **translator arm**).
caulescent: with an obvious leafy stem; having an evident stem above ground.
cauliflorous: producing flowers from old wood (compare **ramiflorous**).

cauline: arising from or inserted on the stem.
centric (of a leaf): filiform to cylindrical with a ± continuous palisade layer (see also **unifacial**).
centripetal: as in **inflorescences**, blooming from the outside inward or from the base upward.
chalaza (*adj.***chalazal**): basal region of the **ovule** where it joins the **funicle**; region of a seed opposite the **micropyle**.
chamaephyte: a perennial plant, generally woody or partly woody, with the mean height of the renewal buds less than or equal to 0.7 m from the ground.
chartaceous: papery in texture, opaque and thin.
chasmogamous: pollinated when the flower is open (compare **cleistogamous**).
chasmophyte: plant growing in rock crevices.
chlorenchyma: **parenchyma** cells containing chloroplasts.
choripetalous: having separate and distinct petals (= **polypetalous**) (compare **gamopetalous**, **sympetalous**).
cilia (*sing.* **cilium**): short epidermal outgrowths, such as hairs or scales ± confined to the margins of an organ.
ciliate: with a fringe of hairs along the edge.
ciliolate: minutely **ciliate**.
cincinnus (*pl.* **cincinni**; *adj.* **cincinnate**): a tight, unilateral **scorpioid cyme**.
circinnate: spirally coiled, with the tip innermost, as the leaves of *Drosera*—Droseraceae.
circumscissile: applied to an organ opening as if cut circularly around the upper part, which then comes off like a lid.
cirrhiferous: producing **tendrils**.
cirrhose: having **tendrils**.
cistolith: see **cystolith**.
cladode: a flattened, foliaceous stem having the form and function of a leaf, but arising in the axil of a minute, bract-like caducous, true leaf (compare **phyllode**).
clathrate: latticed or pierced with apertures like a trellis.
clavate: club-shaped or thickened towards the end.
clavellate: diminutive of **clavate**, thickened towards the apex.
claviform: club-shaped.
claw (*adj.* **clawed**): the narrow base of a petal, sepal or bract.
cleistogamous: (of pollination) occurring when the flower is closed (as in *Viola*—Violaceae) (compare **chasmogamous**).
-cleft: incised almost to the midrib or base.
club-shaped: gradually thickened from a slender base.
coalesce: to fuse.
cobwebby: entangled with fine filaments (see also **arachnoid**).
coccus (*pl.* **cocci**; *adj.* **coccous**): a one-carpel unit of a **schizocarp** or lobed fruit, becoming separate at maturity (e.g. in Euphorbiaceae).
collateral: standing side by side.
colleter: a mucilaginous secretory hair, often occurring in tufts near the base of the leaf **lamina** and on the **calyx** (e.g. in Apocynaceae).
colliculate: covered with little rounded elevations.
colpate (of a pollen grain): having elongate, longitudinal apertures.
colporate (of a pollen grain): having compound apertures (*adj.*of **colporus**).
colporus (of a pollen grain): a compound aperture consisting of an ectocolpus with one or more endoapertures.
colpus (*pl.* **colpi**) (of a pollen grain): a usually longitudinal, ± distinct aperture (compare **sulcus**).
column: (1) the adnate **stamen** and **style** forming a solid central body, as in orchids; (2) the tube of connate **filaments**, as in Malvaceae; (3) a straight structure between the apex of the **lemma** and the branching point of the **awns**, as in *Aristida* and *Stipagrostis* (Poaceae) (see **beak**).
coma: a tuft of hairs at the end of some seeds; a terminal crown of leaves or bracts, e.g. in *Eucomis* (Hyacinthaceae).
commissural: of a joint or seam, such as that between two adhering **sepals**.
commissure: the faces of cohering **carpels** (e.g. in Apiaceae); the place of joining or meeting.
comose: bearing a tuft of **trichomes**, usually apically.
complanate: flattened; compressed.
complicate: folded on itself.
compound: the opposite of **simple**; composed of several similar parts, as a leaf of several leaflets; **compound fruit**: the fruits of separate flowers becoming united into a mass; **compound umbel**: each **ray** again bearing an **umbel**.
compressed: flattened lengthwise from side to side or from front to back.
concolor/concolorous: of uniform colour (e.g. upper and lower leaf surface with the same colour) (compare **discolorous**).
concrescent: growing/grown together.
conduplicate: folded together lengthwise.
condyle: an intrusion of the placenta which forms grooves or cavities in the **endocarp** of the developing fruit (e.g. in Menispermaceae).
confervoid: composed of threads; (of **pollen**): united in strings.
conflorescence: a modified, condensed inflorescence, as found in *Eucalyptus*—Myrtaceae.
connate: applied to parts of the same series which are united so closely that they cannot be separated without tearing.
connective: the part of an anther which connects its two **thecae**.
connivent: applied to parts converging so as to be nearer together above than below.
conoidal: ± conical.
conservation (of a name): the decision of an International Botanical Congress that a validly published name shall be used even though to do so is contrary to the International Code of Botanical Nomenclature (**I.C.B.N.**).
contorted (of **sepals** and **petals**): twisted in the bud so that each overlaps the adjoining one on one side and is overlapped by the other adjoining one on the other side, like a furled umbrella; spirally twisted.
contractile roots: a specialised type of root, often found in bulbous plants, that undergoes contraction and thereby pulls the bulb or shoot parts deeper into the soil.
convexity: the condition of being convex or having a curvature that bulges towards the point of observation.
convolute: rolled up lengthwise (also used in the sense of **contorted**).
cordate: applied to the base of a leaf when it is ± deeply notched.
coriaceous: firm, tough, of the consistence of leather.
corm: a tuberous bulb-like **rootstock**.
cormous: possessing a **corm**.
cornate: bearing a horn.

corniculate: bearing or terminating in a small horn-like protuberance or process.
cornute: bearing a horn.
corolla: the inner envelope of the flower, consisting of free or united **petals**.
corona: a crown; (in the flower of some Apocynaceae and Passifloraceae and others): a circle of appendages between the **corolla** and **stamens**, often united in a ring or crown; in some members of the Asclepiadoideae—Apocynaceae the corona consists of one or two (sometimes three) alternating rows different in size and shape, the outer row nearest to the corolla lobes, the inner row nearest to the **staminal column**.
coroniform: shaped like a crown.
corpuscle/corpusculum (*pl.* **corpuscula**): a small, ± spherical, slightly 2-parted, hard, usually brown to black, sticky body with two flexible arms (**caudicles**), each carrying one **pollinium**, in Asclepiadoideae—Apocynaceae.
cortex: the unspecialised tissue in stems and roots between the vascular bundles and the epidermis.
corymb (*adj.* **corymbose**): a ± flat-topped **racemose inflorescence** in which the branches or **pedicels** start from different points but all reach to about the same level.
costa (*pl.* **costae**): the midvein of a single leaf or the **rachis** of a **pinnately compound** leaf.
costule: the midrib of a **pinnule** or **pinna** segment.
cotyledon: the primary leaf of an **embryo**.
craspedodromous venation: leaf venation characterised by a single primary **vein**, with the lateral veins terminating at the margin.
crassate: coarse, gross, dense, thick.
crenate (*noun* **crenation**) (of a margin): notched with regular blunt or rounded teeth; scalloped.
crenulate: crenate with very small teeth; minutely scalloped.
crescentic/crescentiform: biconcave, resembling the shape of the moon in its first or last quarters.
crested: having a crest, elevated appendage or ridge on the summit of an organ.
crinite: bearded with long, weak hairs.
crispate: curled.
crista (*adj.* **cristate**): a crest or ridge.
cruciform: cross-shaped.
crustaceous: of brittle texture.
cucullate: hooded or hood-shaped.
culm: the stem of Cyperaceae and Poaceae.
cultrate/cultriform: shaped like a knife blade.
cuneate (of the base of a leaf): tapering gradually, i.e. wedge-shaped.
cuneiform: wedge-shaped; triangular, with the narrow part at the point of attachment.
cupule/cupulum (*pl.* **cupula**): a cup-shaped structure at the base of some fruits formed by the fusion of **involucral bracts** at their bases, e.g. the acorn of oaks, a structure at the base of the fruits of some palms, the cup-shaped involucre of some Asteraceae; a series of free **trichomes** apically on **achenes** of Asteraceae which become fused with age.
cupular/cupuliform: applied to a shallow, open structure, as the **involucre** of an acorn.
cusp: an abrupt, sharp, often rigid point.
cuspidate: abruptly tipped with a sharp rigid point.
cuticle: a noncellular layer of waxy or fatty materials on the outer wall of epidermal cells.
cutin (*adj.* **cutinous**): a waxy, waterproof substance that is the main constituent of the plant **cuticle**.
cyathiform: cup-shaped.
cyathium: an **inflorescence** resembling a single flower, composed of unisexual flowers surrounded by **bracts** and often by **glands**, typical of *Euphorbia*—Euphorbiaceae.
cymbiform: boat-shaped.
cyme (*adj.* **cymose**): a **determinate inflorescence** in which each flower, in turn, is formed at the tip of a growing axis, and further flowers are formed on branches arising below it (compare **indeterminate** inflorescence).
cymule: a small **cyme** or portion of one, usually few-flowered.
cypsela (*pl.* **cypselae**): an **achene** derived from a 1-loculed, **inferior** ovary; as in the indehiscent fruits of Asteraceae (compare **achene**).
cystolith: mineral concretion, usually of calcium carbonate, in the epidermis of e.g. Acanthaceae and Urticaceae, showing up as streaks or protuberances, particularly in dried material.

D

deciduous: falling off at the end of the season of growth (compare **evergreen**).
declinate: angled downwards or forwards (compare **decurved**).
decompound: applied to leaves that are several times divided or **compound**.
decrescent: decreasing, gradually growing less.
decumbent: spreading horizontally at first but then growing upwards.
decurrent: as when the edges of the leaf are continued down the stem or petiole as raised lines or narrow wings.
decurved: angled downwards and curved or curled.
decussate: in opposite pairs, with each pair at right angles to the one above and below it.
deflexed: bent abruptly downwards or outwards (compare **inflexed**).
dehiscent/dehiscing (*noun* **dehiscence**): opening spontaneously when ripe as in **capsules** and **anthers**.
deliquescent: dissolving or melting away.
deltate: shaped like an equal-sided triangle.
deltoid: shaped ± like an equal-sided triangle.
dendritic/dendroid: tree-like; resembling the shape of a tree; having a branched appearance.
dentate (of a margin): prominently toothed, the teeth directed outwards.
denticulate: finely toothed/**dentate**.
depressed: ± flattened from above downwards or at least at the top.
determinate (of an **inflorescence**): with a **bud** or **flower** terminating the growth of the main axis (compare **indeterminate**).
dextrorse: turned toward the right (compare **sinistrorse**).
di- (*prefix*): two-.
diad (of a pollen grain): two fused together (compare **monad**, **tetrad**).
diadelphous: having the **stamens** united into two groups, or all but one united in a group and one free (e.g. many Fabaceae) (compare **monadelphous**).
diadem: a crown.
diaphanous: very thin and transparent.
dichasium (*adj.***dichasial**): a **determinate** type of **cymose** inflorescence having a central, older flower which develops first and a pair of opposite lateral branches bearing younger flowers (compare **monochasium**).
dichlamydeous: said of a flower having two whorls of **perianth** parts.

dichotomous: forking regularly into two equal branches.
dicotyledon: a flowering plant having two **cotyledons** in the seed (compare **monocotyledon**).
dictyostelic: with vascular bundles concentrically arranged with large overlapping **leaf gaps**, in the trunk.
didymous: 2-lobed; (of **anthers**): distinctly 2-lobed but with almost no connective.
didynamous (of **stamens**): with four in two pairs of unequal length, e.g. in Acanthaceae and Lamiaceae.
diffuse: loosely and openly branching or spreading.
digitate: like the fingers of a hand, with the members arising from the same point.
digitiform: shaped like a finger.
dimidiate: having one of two sides or parts more developed than the other.
dimorphic/dimorphous: of two forms.
dioecious: with unisexual flowers, the male and the female flowers on separate plants (compare **monoecious**).
diploid: having two of the basic sets of chromosomes in the nucleus (compare **haploid**).
disarticulate: breaking apart at the joints.
disc: (1) an enlargement of the **receptacle** within the calyx or within the corolla or stamens, usually in the form of a ring, cup or cushion, often lobed or even cut up into so-called (nectary) **glands**; (2) **disc floret**: the central florets as compared with the **ray florets** in a head of the Asteraceae.
disciform (of heads of Asteraceae): with central flowers perfect with tubular **corollas**, and the marginal flowers **pistillate** or neuter but without **ligules**, their corollas tubular or wanting.
discoid: (1) like a disc or plate; (2) applied to the heads of Asteraceae without **ray** flowers.
discolorous: of a leaf in which the two surfaces are unlike in colour (compare **concolorous**).
dissepiment: a partition (**septum**) within an ovary or fruit, derived from fusion of adjacent **carpels**.
distal: farther from the point of attachment or origin (compare **proximal**).
distichous: regularly arranged one above the other in two opposite rows, one on each side of the stem or **rachis**.
diurnal: happening during the day.
divaricate: widely divergent or spreading in different directions, and often ± horizontal.
dizonasulculate (of a pollen grain): with two ring-like **sulci** around the equator.
domatium (*pl.* **domatia**): small swelling/pocket on the lower surface of the leaf of some woody dicotyledons in the axils of the primary veins, usually partly enclosed by leaf tissue or hairs.
dorsal: relating to or situated on the face turned away from the axis; (of a leaf): the lower surface; (of a thallus): the upper surface, facing away from the substrate (compare **ventral**).
dorsifixed: attached at or by its back, said e.g. of an **anther** to the **filament**.
dorsiventral: flattened and having distinct **dorsal** and **ventral** surfaces, the two usually different, as in many leaves.
drupe (*adj.* **drupaceous**): an indehiscent, fleshy fruit, usually 1-seeded, in which the **pericarp** is clearly tripartite: a tough **exocarp**, a fleshy **mesocarp** and a hard **pericarp**, found e.g. in plum or cherry, in *Flacourtia* and *Ximenia* and in the **aggregate** '**fruit**' of e.g. *Rubus* (Rosaceae); **drupaceous** often refers to a fruit that is drupe-like but not strictly a drupe (compare **berry**, **pyrene**).
drupelet: a small **drupe**.
druse: an aggregate of crystals within a cavity.
duplicate: folded twice.

E

e- (*prefix*): often implying absence of something, e.g. in **ebracteate**, **eglandular**.
ebracteate: without **bracts**.
ecalcarate: without a spur.
ecallose: without **callus/calli**.
ecalyculate: without a **calyculus**.
ecaudate: without a tail-like tip or appendage.
echinate: covered with **prickles** like a hedgehog.
echinolophate (of a pollen grain): **lophate** with **echinate** ridges.
echinulate: covered with small, pointed **spines**.
effuse: spreading out loosely, especially of an inflorescence.
efoliate: without leaves.
eglandular: having no glands.
elaiosome: an appendage of a seed, usually rich in oil, attractive to animals (especially ants) and hence an aid to dispersal by such animals.
eligulate: without a **ligule**.
ellipsoid: an elliptic solid.
elliptic: in the form of a flattened circle more than twice as long as broad.
emarginate: notched at the extremity.
embryo: the rudimentary plant still enclosed in the seed, consisting of the **radicle** from which the root develops, the **cotyledons** (one, two, rarely more), which become the earliest leaves, and the **plumule**, the bud from which the stem and further leaves develop.
emergent/emersed: with part of the plant aerial and the rest submersed; with part extending out of the water.
endemic: having a natural distribution confined to a particular geographical region.
endocarp (*adj.* **endocarpal**): the innermost layer of the wall of a fruit.
endosperm: formerly called **albumen**, the nutritive material (mealy, oily, fleshy or horny), formed in the embryo sac after fertilisation and stored within the seed and often surrounding the embryo (compare **perisperm**).
endothecium (*adj.* **endothecial**): the inner lining of the **theca** of an **anther**.
enervate: without **nerves**.
ensiform: sword-shaped.
entire: with an even margin without teeth, lobes, etc.
entomophilous (of pollination): effected by insects (compare **anemophilous**, **hydrophilous**, **ornithophilous**).
epaleate: without **paleae**.
epapillate: without **papillae**.
epappose: without a **pappus**.
epi- (*prefix*): on, upon, above, over.
epicalyx: an **involucre** of **bracts** arising below the flower, resembling an extra **calyx**, as in some Malvaceae (see also **calyculus**).
epicarp: the outer layer of the wall of a fruit (see also **pericarp**).
epichile (of an orchid flower): apical portion of a longitudinally two- or three-partite **lip**.
epidermis (*adj.* **epidermal**): the outermost layer of cells of an organ, usually only one cell thick.
epigeal: describing seed germination in which the **cotyledons** emerge from the seed and are elevated above the soil surface (compare **hypogeal**).
epigynous: applied to the flower when the sepals, petals and stamens are apparently borne above the ovary,

the latter being enclosed in an adnate **receptacle** or **calyx tube** (compare **hypogynous**, **perigynous**).
epilithic: living on rocks (= **lithophytic**).
epipetalous: borne on the **petals**.
epiphyte (*adj.* **epiphytic**): a plant that grows on another plant but without deriving nourishment from it, i.e. not parasitic, as some ferns and orchids growing on trees.
episepal: an **epicalyx** segment.
episepalous (of **stamens**): borne on the **sepals**.
epitropous/epitropic (of an **anatropous** ovule): with its **raphe** facing the **placenta** when **pendulous**, facing away from it when **ascending**.
equitant (*literally* riding, astride); (of leaves): folded sharply in half along the midline so that the adaxial surface is hidden and the margins overlap both margins of a similarly folded leaf on the opposite side of the stem, thus creating a 2-ranked arrangement typically found in Iridaceae (compare **obvolute**).
ericoid: resembling plants of the family Ericaceae, especially their small, tough leaves.
erose: applied to a margin which is irregularly eroded, gnawed or jagged.
estipitate: having no **stipe**.
estrophiolate: having no **strophiole**.
evagination: something that is inside out.
evanescent: disappearing quickly.
ex- (*prefix*): often implying absence of something, e.g. **exstipulate**.
exalbuminous: without **albumen/endosperm**.
exannulate: without an **annulus** or other ring-like structure.
excrescence: an outgrowth or protuberance, e.g. on the stem of a tree.
excurrent: extending beyond the apex or margin of a leaf into a mucro or awn.
exfoliate: peeling off in layers or shreds.
eximbricate: not **imbricate**.
exine: outer wall of spores and **pollen** grains, usually divided into different layers.
exocarp: the outer layer of the **pericarp**.
exserted: projecting beyond, as the stamens from the tube of the corolla (compare **included**).
exstipulate: without **stipules**.
extra-axillary: beyond or outside the **axil**.
extra-floral (of nectaries): not within the flower.
extrastaminal (e.g. of the **corona**): outside the **stamen** whorl.
extrorse: of an **anther** which opens outwardly towards the circumference of the flower (compare **introrse**).

F

facultative (of **parasites**): optional (compare **obligate**).
falcate: curved like a scythe.
family: a group of one to many genera believed to be related phylogenetically, usually clearly separable from other such groups; the major taxonomic group between genus and order.
farinose: covered with mealy powder resembling flour.
fascicle (*adj.* **fascicled/fasciculate**): a cluster of flowers, leaves, etc. arising at about the same point.
fastigiate: strictly erect and ± parallel to other members, e.g. with reference to stems or branches.
faucal: of the throat of a **gamopetalous** corolla.
fenestrate: having openings or translucent areas ('windows').
ferrugin(e)ous: rust-coloured.
fetid: see **foetid**.
fibril: submicroscopic thread or fibre that constitutes the form in which cellulose occurs in the cell wall.
fibrillose: covered with small fibres.
-fid (*suffix*): indicating number of parts into which an organ is cleft (divided up to ± the middle).
filament: the stalk of a **stamen** supporting the **anther**; a thin thread.
filamentous: thread-like.
filiform: slender, thread-like.
fimbriate: with the margin bordered by long, slender, hair-like processes.
fimbrillate/fimbrilliferous: minutely **fimbriate**.
fistular: hollow throughout its length, like a pipe but closed at the ends.
flabellate: fan-like.
flaccid: weak, limp, lax or flabby, tending to wilt (compare **turgid**).
flag leaf: the first leaf below the inflorescence.
flexuose/flexuous: zigzag or bent alternately in opposite directions.
floccose: covered with woolly hairs which tend to rub off and adhere in small masses.
floral: belonging to or associated with a flower.
florescence: **inflorescence** with a cluster of flowers terminating the main axis, but not terminating with a flower and hence apex of florescence remaining **indeterminate** forming exclusively lateral flowers.
floret: small individual flowers that make up a (dense) inflorescence, as those in the **heads** of Asteraceae or the **spikelets** of Poaceae.
floricane: a flowering and fruiting stem, especially of brambles (*Rubus* spp.—Rosaceae).
flower: the sexual reproductive structure of angiosperms, typically consisting of **gynoecium**, **androecium** and **perianth** and the **axis/receptacle** bearing these parts.
foetid/fetid: having a disagreeable odour.
foliaceous: leaf-like.
foliar: of or relating to a leaf.
foliolate: having **leaflets**.
follicle (*adj.* **follicular**): a fruit formed from a single **carpel** opening usually only along the inner (i.e. ventral) **suture** to which the seeds are attached.
forb: a non-woody plant other than a grass, sedge, rush, etc. (compare **herb**).
-form (*suffix*): superficially resembling; e.g. an umbelliform inflorescence is one that resembles, but is not a true **umbel**.
fornix (*pl.* **fornices**): a small scale.
foveate: pitted.
foveolate: marked with small pitting.
free: neither adhering nor united; **free-basal placenta**: one in which the ovules are attached to a central column arising from the base of the ovary cavity and not reaching the top, e.g. in Primulaceae; **free-central placenta**: the same but reaching to the top of the cavity, e.g. in most Caryophyllaceae.
frond: leaf of a fern, palm or cycad, or the **thallus** of e.g. Lemnaceae.
frondose: leafy.
frutescent: becoming shrub-like (woody).
fruticose: shrub-like.
fugaceous: lasting only for a short time.
fugitive: moving from place to place; evanescent, quickly fading or perishable, volatile.
fulvous: tawny.
funicle/funiculus: the stalk which attaches the **ovule** to the **placenta**.
funnelform: funnel-shaped, gradually widening upwards.
furcate: forked.
fuscous: of a brownish grey colour.

fusiform: spindle-shaped, thick but tapering towards each end.

G

galea: a **petal** shaped like a helmet; the strongly concave upper lip (petal) of some **bilabiate** corollas.
galeate: helmet-shaped; having a **galea**.
gamete: a **haploid** cell or nucleus that fuses with another, of opposite sex, in sexual reproduction.
gametophyte: a plant, or phase of a plant's life cycle, that bears **gametes**.
gamopetalous: with the **petals** united, either entirely or at the base into a tube, cup or ring (see also **choripetalous**, **sympetalous**; compare **polypetalous**).
gamosepalous: with united **sepals**.
gamotepalous: with united **tepals**.
gasteriform: shaped like a belly; (of a perianth tube, e.g. in *Gasteria*—Asphodelaceae): basally inflated.
gemma (*pl.* **gemmae**): an **adventitious bud** capable of reproducing the plant; a process found on pollen grains.
gemmiferous: bearing **gemmae**.
geniculate: bent like a knee.
genome: a complete **haploid** set of chromosomes, as present in a **gamete**.
genotype: the total complement of hereditary factors (genes) acquired by an organism from its parents and available for transmission to its offspring (compare **phenotype**).
genus (*pl.* **genera**): a group of species believed to be related phylogenetically and usually clearly separable from other such groups, or a single species without close relatives; the major taxonomic rank between species and family.
geocarpic/geocarpous: referring to the development of fruits in the ground originating from flowers which developed and were pollinated above ground.
geophyte: a perennial plant, usually herbaceous, with renewal buds located on the plant below the soil surface, as on **bulbs** or **rhizomes**.
geoxylic: of a woody plant with numerous stems arising from a subterranean **rhizome**.
gibbosity (usually of a **calyx** or **corolla**): a pouch-like swelling or hump.
gibbous: with a **gibbosity**.
glabrate: glabrous, but obviously having previously had an **indumentum**.
glabrescent: becoming **glabrous** or nearly so.
glabrous: devoid of hairs.
gland (*adj.* **glandular/glandulose**): (1) secreting structure on the surface or embedded in the substance of a leaf, flower, etc., or raised on a stalk (glandular hairs or stipitate glands); (2) a warty protuberance or fleshy excrescence (often on petiole, inflorescence, or within the flower); (3) (see **corpuscle**).
glaucous: pale bluish green or with a pale bloom.
globose: ± spherical or rounded.
glochid/glochidium (*pl.* **glochidia**; *adj.* **glochidiate**): barbed bristle or hooked hair.
glomerate: compactly clustered.
glomerule (*adj.* **glomerulate**): a small compact cluster.
glumaceous: resembling the **glumes** of Poaceae.
glume: a **bract**, usually chaffy, in the **spikelets** of Cyperaceae, Poaceae and similar plants.
glutinous: with a sticky exudate.
granulose/granulate: finely covered with very small granules.
gregarious: growing in groups or colonies.
guide rails: see **gynostegial grooves**.
gymnosperm: a seed plant with the ovules borne on the surface of a **sporophyll** (compare **angiosperm**).
gynobase: a dilation or prolongation of the receptacle which bears **carpels/nutlets** (e.g. in Boraginaceae).
gynobasic (of the **style**): arising apparently from the base of the **gynoecium**, e.g. between the lobes of the ovary, as in Boraginaceae and Lamiaceae.
gynodioecious: having bisexual flowers and female flowers on separate plants (compare **gynomonoecious**).
gynoecium: the female part of the flower, consisting, when complete, of **ovary**, **style** and **stigma**; also called **pistil**.
gynomonoecious: having bisexual and female flowers on the same plant (compare **gynodioecious**).
gynophore: a stalk supporting the **gynoecium** and formed by an elongation of the **receptacle**.
gynostegial corona: collective term for the **staminal** and **interstaminal coronas**, both of which are associated with the **gynostegium**.
gynostegial grooves: the grooves between the lateral margins of adjacent anthers fused to the **style head**, in Apocynaceae (also known as **anther slits**, **anther wings** or **guide rails**) (see also **gynostegium**).
gynostegium (*pl.* **gynostegia**): a structure formed by the union of the **stamens** with part of the **pistil**, as in Apocynaceae.
gynostemium (*pl.* **gynostemia**): the **column** in the centre of flowers of Orchidaceae formed by the union of the stamen with part of the **gynoecium**.

H

habitat: the environment in which a plant lives.
hair type B (in tribe Gnaphalieae—Asteraceae): with one basal cell and a very long terminal cell.
half-inferior (of an **ovary**): partly below and partly above the level of attachment of **perianth** and **stamens**.
halophilous: salt-loving.
halophyte: a plant that grows in very salty soil.
haploid: having a single set of unpaired chromosomes, as in the nucleus of one of the **gametes**.
hapteron (*pl.* **haptera**): flattened organ, without vascular tissue, attaching the **thalli** of Podostemaceae to the substrate by a cement-like substance.
hastate: applied to the base of a leaf when it has two more or less triangular lobes diverging laterally.
hastula (in palms with **palmate** leaves): the outgrowth from the top of the leaf stalk (**rachis**).
haustorium (*pl.***haustoria**): a specialised root of parasitic plants capable of penetrating host tissue and thus absorbing nutrients.
head: a dense **inflorescence** of sessile or nearly sessile flowers on a compound **receptacle** (see also **capitulum**).
helical: shaped like a helix/spiral.
helicoid: coiled; (of a **cymose** inflorescence): branching repeatedly on the same side.
heliophilous: sun-loving.
helophytic: growing in marshes.
herb: any vascular plant that never produces a woody stem (compare **forb**).
herbaceous: not woody; soft in texture.
hermaphrodite (*adj.* **hermaphroditic**): an organism or structure possessing both male and female reproductive organs, e.g. a flower with both stamens and pistil (= **bisexual**).
heteroblastic: having the adult parts of the plant (especially the leaves) distinctly different in form from the juvenile parts.

heterocarpic/heterocarpous: having carpels or fruit of more than one kind.
heterocarpy: having two kinds of fruit.
heterodistylous: said of a species in which two kinds of plants occur, those with long styles and those with short styles.
heterogamous: of different sexes; (of a flowerhead, as in some Asteraceae): having two kinds of **florets**, those of the **ray** florets being neuter or unisexual and those of the **disc** florets bisexual; of **spikelet** pairs in Poaceae: consisting of a sterile and a female-fertile spikelet (compare **homogamous**).
heteromorphic: of different forms (compare **homomorphic**).
heterophyllous: having leaves of different forms.
heterosporous: having two types of **haploid** spores (compare **homosporous**).
heterostylous: applied to a species which has flowers with **styles** differing in length or shape (compare **homostylous**).
heterothetic (of a compound raceme): composed of a terminal as well as lateral racemes.
hilum (*adj.* **hilar**): the scar left on the seed where it was attached to the **funicle** or **placenta**.
hippocrepiform: horseshoe-shaped.
hirsute: with rather coarse, stiff hairs (compare **villous**).
hirsutulous: minutely **hirsute**.
hispid: bristly pubescent.
hispidulous: minutely **hispid**.
hoary: covered with white or greyish white, very short, closely interwoven hairs.
holonectary (e.g. in Mesembryanthemaceae): a nectary forming a continuous ring.
homogamous: applied to a flowerhead/**capitulum** with all the flowers of the same kind; or to spikelet pairs in Poaceae that are of the same sexuality (compare **heterogamous**).
homomorphic/homomorphous: uniform in shape (compare **heteromorphic**).
homonym (in nomenclature): a name spelled exactly like a validly published name for a taxon of the same rank based on a different type.
homosporus: having only one type of **haploid** spore (compare **heterosporous**).
homostylous: species in which the flowers have **stigmas** and **anthers** held at the same level relative to each other on all plants (compare **heterostylous**).
hood (in flowers of Asclepiadoideae—Apocynaceae): a concave segment of the **corona**.
host: an organism on which a **parasite** lives and by which it it nourished (also applied, loosely, to a plant supporting an **epiphyte**).
humifuse: lying or spreading on the ground.
hyaline: almost transparent.
hydathode: a minute pore or specialised structure through which water is discharged from a leaf by guttation; sometimes differentiated as secretory **trichomes**.
hydrophily (*adj.* **hydrophilous**) (of pollination): effected by water.
hydrophyte (*adj.* **hydrophytic**): a plant living in water or in a very moist habitat; an aquatic plant.
hygrochastic: applied to plants in which opening of the fruit and dispersion of the spores or seeds are caused by absorption of water.
hygrophytes (*adj.* **hygrophytic**): marsh plants or plants that need a large supply of moisture for their growth.
hygroscopic: readily absorbing and retaining moisture from the atmosphere, resulting in changes in form or position of certain cells or structures.
hypanthium (*pl.* **hypanthia**): a cup or tube bearing floral parts above the base, and often above the top of the ovary of a flower, e.g. in many Myrtales or Onagraceae (see also **calyx tube**).
hypochile (of an orchid flower): the basal part of a longitudinally two- or three-partite **lip**.
hypocotyl: the part of the stem of an **embryo** or young seedling below the cotyledonary node.
hypocrateriform: see **salverform**.
hypogeal: growing or remaining below ground; describing seed germination in which the **cotyledons** remain below the soil surface (compare **epigeal**).
hypogynium (*pl.* **hypogynia**): portion of the **receptacle** below the ovary, e.g. in Cyperaceae.
hypogynous: having the flower parts attached below the base of the ovary and free from it; flowers with this arrangement have a **superior** ovary (compare **epigynous**, **perigynous**).
hypsophyll: leaf borne at the upper level of a plant, as with various floral bracts; some possibly have a protective function.
hysteranthous (of leaves): appearing after the flowers (compare **synanthous**).

I

I.C.B.N. = International Code of Botanical Nomenclature.
idioblast: a cell that differs from those around it in the same tissue.
illegitimate (of a validly published name): contrary to one or more articles of the **I.C.B.N.**
imbricate: (1) overlapping like tiles; (2) applied to parts in a flower bud where one **sepal** or **petal** is wholly internal and one wholly external and the others are overlapping at the edge only.
immaculate: without spot or stain; pure, unblemished, undefiled.
immarginate: not **margined** or bordered.
imparipinnate: having an uneven number of **pinnae**, by virtue of having one terminal **pinna**.
imperforate: not perforated.
inaperturate (of a pollen grain): without germinal pores.
incised: margin cut rather deeply and sharply.
included: not projecting (compare **exserted**).
incrassate: thickened.
incumbent: resting or lying (on); (of the orientation of an **embryo**): with the **cotyledons** lying face to face and folded downwards beside the **radicle** (as in some Brassicaceae); (of anthers): lying against the inner face of the **filament**.
incurved: bent or curved inwards or upwards; (of leaf margins): curved towards the **adaxial** surface.
indefinite: variable in number; numerous; many; (of stamens): more than twice as many as the petals or sepals; (of an inflorescence): not terminating in a flower, i.e. having a continuing terminal growing point.
indehiscent: not opening when ripe.
indeterminate: (1) (of an **inflorescence**): the lateral or lower flowers mature first while the primary axis continues to grow, hence the terminal flower is the last to open, therefore a **racemose** inflorescence (compare **cymose**) (2) (of growth): (= **monopodial**) the condition in which the terminal bud persists and produces successive lateral branches.

indumentum: any covering of a surface such as hairs, wool, scales.
induplicate: with margins (of **petals** or **sepals**) folded inwards but not overlapping.
indurated: hardened.
indusium (*pl.* **indusia**): a cup covering the **stigma**, as in Goodeniaceae.
inferior: beneath or below, as in a **calyx** which is below the **ovary**, the latter then being **superior**; as in an ovary which appears to be below the calyx, the latter being adherent to the ovary.
inflexed: bent sharply inwards, upwards or forwards (compare **deflexed**).
inflorescence: the arrangement of the flowers.
infra- (*prefix*): below; beneath.
infructescence: the arrangement of fruits on a plant.
infundibular/infundibuliform: funnel-shaped.
inrolled: see **involute**.
insectivorous: catching, and presumably feeding on, insects.
inserted: attached, included.
insertion: place of attachment.
integument: one of the outer layers of tissue of an **ovule**.
intercalary (of growth): between apex and base, not apical.
internode: the portion of a stem between two nodes (compare **node**).
interpetiolar: applied to **stipules** placed between the **petioles** of opposite leaves (often **connate**).
intersepalar: between the **sepals**.
interstaminal corona: fleshy lobes, often connate into a tube, attached to the base of the **staminal column** in the interstaminal areas (compare **gynostegial corona**, **staminal corona**).
interstice: space between structures.
interstitial: situated in **interstices** or spaces between structures; interstitial growth: a type of growth occurring in organs that do not have specific or localised **meristematic** regions; all-over growth, as in some fruits.
intrapetiolar: between the **petiole** and the stem (compare **interpetiolar**).
intrastaminal: between the **stamens**.
introduced: not indigenous; not native to the area in which it now occurs (compare **adventive**, **naturalised**).
introflexed: see **inflexed**.
introrse: applied to an **anther** opening towards the centre of the flower.
intruse: projecting or pushed out, in or forward.
invested: covered tightly; the focus is on the tight fit, e.g. an **integument** invests a seed.
involucel: **involucre** of bracteoles surrounding a secondary inflorescence such as the base of an **umbellule**.
involucrate: having an **involucre** of some kind.
involucre/involucrum (*adj.* **involucral**): a number of bracts, e.g. those surrounding the base of a flowerhead/**capitulum** or of an **umbel**.
involute: having the edges of the leaves rolled towards the **adaxial** surface (compare **revolute**).
irregular (of a flower, calyx or corolla): bilaterally symmetrical, symmetrical about one plane only, usually the plane that bisects the flower vertically along the longitudinal axis; (= **zygomorphic**) (compare **actinomorphic**, **regular**).
isobilateral (= **isolateral**) (of a leaf): having structurally similar upper and lower surfaces.
isopolar (of a pollen grain): with the equatorial plane dividing the grain into similar halves, i.e. the proximal and distal faces are similar.
isthmus (*pl.* **isthmi**): a narrow part or organ connecting two larger parts.

J

jugate: coupled or yoked together, applied especially to the **leaflets** of a **pinnate** leaf.

K

keel: (*syn.* **carina**): a ridge like the keel of a boat; in Fabaceae a boat-shaped structure formed by the fusion of the two **anterior petals**.
keeled: ridged along the middle of a flat or convex surface.
kneed: having a knee-like joint.

L

labellum: a **lip** (see there).
lacerate: cut irregularly; appearing torn, as in certain leaves and **ligules**.
lacinia (*pl.* **laciniae**): a slender lobe.
laciniate: cut into slender, pointed lobes.
lacinulate: finely **laciniate**.
lacuna (*pl.* **lacunae**): (1) an internal air space or chamber, usually between cells, as in leaf, stem and root tissues; also any space within a cell; (2) a **leaf gap** as viewed in cross sections of stem nodes.
lacunar: referring to or arising from **lacunae**.
lacunose: full of **lacunae**; having air-cells.
laevigate: see **levigate**.
lageniform: shaped like a Florence flask.
lamella (*pl.* **lamellae**; *adj.* **lamellate**): a thin plate or layer.
lamina (*pl.* **laminae**): the limb, blade or expanded part of a leaf, sepal or petal.
lanate: woolly.
lanceolate: lance-shaped; about four times as long as broad, broadest in the lower half and tapering toward the apex.
lanuginose: cottony, similar to **lanate**, but with shorter **trichomes** (hairs).
latex: a viscous fluid exuded from the cut surfaces of leaves and stems of certain plants.
latiseptate: with broad partitions (compare **angustiseptate**).
latrorse (of **anthers**): opening laterally, i.e. towards adjacent anthers.
leaf gap: gap left in the vascular system at the node of a stem at the point where the vascular element supplying the leaf, branches off.
leaflet: the ultimate member of a **compound** leaf.
legume: a simple fruit, consisting of a single **carpel**, usually dry and usually opening along both **sutures** into two halves, e.g. in the Fabaceae; any member of the Fabaceae.
lemma: the lower of two **bracts** enclosing the florets of Poaceae.
lenticels (*adj.* **lenticellate**): corky spots on the bark through which gaseous exchange occurs.
lenticular: shaped like a biconvex lens.
lepidote: clothed with small, scurfy scales.
levigate: having a smooth, polished surface.
liana/liane: a woody climber with rope-like stems.
ligneous: of or resembling wood.
lignified: woody, due to the deposition of lignin in cell walls.
lignotuber (*adj.* **lignotuberous**): a woody swelling at the base of the shoot system below or just above the

ground, containing **adventitious** buds from which new shoots develop if the top of the plant is cut off or burned.

ligulate: strap-shaped, applied e.g. to the **ray** florets in many Asteraceae.

ligule: (1) a thin, membranous and/or hairy appendage at the top of the leaf sheath as in Poaceae; (2) the **limb** of **ray florets** in Asteraceae.

limb: the upper, usually expanded part of the calyx or corolla above the tube, throat or claw.

linear: long and very narrow in relation to the length and with parallel edges (compare **lorate**).

lineolate: marked with fine lines.

lingulate: tongue-shaped.

lip: (1) one of two divisions of a **gamosepalous calyx** or a **gamopetalous corolla** when it is cleft into an upper (posterior) and a lower (anterior) portion (see **bilabiate**); (2) of an orchid: the lowest petal (the inner median perianth lobe), usually enlarged and different in form from the two lateral ones (= **labellum**).

lithophyte (*adj.* **lithophytic**): a plant that grows on rocks (= **epilithic**).

lobe: any division or segment of an organ (usually rounded); specifically a part of a leaf, petal or calyx cut less than halfway to the centre.

lobulate/lobuled: having small lobes.

lobules: small lobes.

locellate: divided into small secondary compartments.

locular: having chambers; thus: **unilocular** = one-chambered; **bilocular** = two-chambered, etc.

locule/loculus: a chamber or cell of an ovary or fruit or anther containing ovules or seeds or pollen grains.

loculicidal: referring to the dehiscence of a fruit which splits down the middle of the cells or **locules** (i.e. the midrib or dorsal suture) and not at the line of junction of the **carpels**, e.g. in most Liliaceae (in wide sense) (compare **septicidal**).

lodicule/lodicula (*pl.* **lodiculae**): a small scale outside the stamens in flowers of the Poaceae.

loment/lomentum: modified **legume** fruit with constrictions between the seeds, which at maturity separates at the constrictions into 1-seeded segments.

lophate (of a pollen grain): with the outer **exine** raised in a pattern of ridges.

lophomorphic: crested.

lorate (*syn.* **loriform**): strap-shaped; moderately long with parallel sides (compare **linear**).

lumen: the cavity of a plant cell.

lunate/luniform: shaped like the waxing moon.

lunulate: finely **lunate**.

lyrate: applied to a leaf which is pinnately lobed or cut into small segments below, but with a much larger terminal lobe.

lysigenous: originating by dissolution of cells.

M

maculate (*noun* **maculation**): spotted or blotched.

mallee: scrub vegetation composed mainly of **Eucalyptus* spp. (Myrtaceae) about 2–10 m high in dry, subtropical parts of southwest and southeast Australia.

mam(m)illate: having small nipple-shaped projections.

marcescent: withering without falling off.

marginal: occurring at or very close to the margin.

marginal placentation: the type of **placentation** found in a **gynoecium** consisting of a single **carpel** or of two or more free carpels and where the margins of the carpel(s) have become united to form a suture along which the ovules are borne (see also **axile** and **parietal placentation**).

marginate/margined: having a margin of distinct colour or texture.

marmorate: marbled, having coloured veins.

medial/median: of or situated in the middle.

medifixed: fixed by the middle, e.g. of an anther (compare **basifixed**, **dorsifixed**, **versatile**); (of a hair): ± T-shaped with the stem much shorter than the cross-bar.

medulla: the pith of a stem.

megaspore: the larger of the two kinds of spores produced in the sexual life cycle of a **heterosporous** plant, giving rise to the female **gametophyte**.

membranaceous/membranous: of thin, translucent texture.

mentum: an extension of the base of the **column** in the flower of some Orchidaceae.

mericarp: one segment of a fruit that breaks at maturity into units derived from the individual carpels, e.g. in Apiaceae or Malvaceae (see also **schizocarp**).

meridional: running in a north-south direction, from apex to base.

meristem (*adj.* **meristematic**): growing region of a plant in which cells which have retained their embryonic characteristics, or have reverted to them secondarily, divide to produce new cells.

-merous (*suffix*): indicating number of parts, e.g. flowers 5-merous where floral organs are present in 5s.

mesocarp: the fleshy portion of the wall of a succulent fruit inside the skin and outside the stony layer, if any, surrounding the seed(s) (see also **pericarp**).

mesochile (of flowers of certain Orchidaceae): the middle portion of a longitudinally two- or three-partite **lip**.

mesomorphic: having characteristics suited to growing in environments that are neither very dry nor very wet.

mesophyll: photosynthetic tissue of a green plant.

mesophyte (*adj.* **mesophytic**): plants which grow in environments that are neither very wet nor very dry; plants intermediate in moisture requirements between **hydrophytes** and **xerophytes**.

micropyle: a minute canal through the **integument(s)** of an ovule through which the pollen tube enters and which persists as a pore in the seed coat.

microsporangium (*pl.* **microsporangia**) (in an **anther**): the chamber in which the pollen is formed (= **pollen sac**) (see **anther**).

microspore: the smaller of the two kinds of spores produced in the sexual life cycle of a **heterosporous** plant, giving rise to the male **gametophyte**.

midrib: the principal, usually central nerve of a leaf or leaf-like part.

mitre-shaped/mitriform: shaped like a bishop's cap.

monad (of pollen grains): single, not fused to others (compare **diad**, **tetrad**).

monadelphous (of stamens): in one bundle, e.g. in certain Fabaceae and Malvaceae.

moniliform: like a string of beads.

mono- (*prefix*): one; single.

monocarpic: applied to a plant which flowers and fruits only once and then dies (compare **polycarpic**).

monochasium (*pl.* **monochasia**; *adj.* **monochasial**): a **cyme** reduced to single flowers on each axis (the laterals of the **dichasium** having been lost by reduction).

monochlamydeous: with a perianth of a single **whorl** of similar parts (**tepals**).

monocotyledon: a flowering plant having a single **cotyledon** in the seed (compare **dicotyledon**).
monoecious: with male and female flowers separate but borne on the same individual plant.
monolete: with the dehiscence line unbranched, as in bilateral spores.
monomerous: formed of a single member.
monomorphic/monomorphous: of one form only.
monophyletic: derived from a single ancestral line (compare **polyphyletic**).
monopodial (of growth): with a persistent terminal growing point producing many lateral organs successively (compare **sympodial**).
monosulcate (of a pollen grain): having a single longitudinal groove or **sulcus**.
monothecous (of an anther): having one **theca**.
monovalent/univalent: a single, unpaired chromosome during meiosis.
morchelliform: shaped like a morel (a fungus of the genus *Morchella* which has a pitted cap).
mucilage (*adj.* **mucilaginous**): a gelatinous substance which absorbs water and increases in bulk.
mucous: slimy.
mucronate: ending abruptly in a short stiff point which is a continuation of the midrib.
mucronulate: finely **mucronate**.
multifid: divided into many lobes or segments.
muricate: rough, with short hard tubercles or pointed protuberances.
muriculate: finely **muricate**.
muticous: blunt, without a point.
mycorrhiza: a symbiotic union between a fungus and a plant root.
mycotrophic: of a plant possessing mycorrhiza.
myxogenic: capable of forming mucus (when wetted).

N

naked (of seeds): exposed on the surface of a sporophyll (not enclosed within an ovary); (of flowers): without perianth.
-nate (*suffix*): indicating number of parts in a group, e.g. leaves 3-nate = three leaves in a group or cluster.
naturalised: introduced and reproducing itself without human assistance (compare **adventive**, **introduced**).
navicular /naviculate/naviculiform: boat-shaped.
nectar guides: floral orientation cues directing a pollinator to the nectar.
nectary/nectarium (*adj.* **nectariferous**): any structure that secretes nectar.
nerves: the principal or more conspicuous **veins** or ribs of a leaf or other organ.
net-veined: with the smaller veins connected like meshes of a net; reticulate.
nigropunctate: with black dots.
nitid: glossy, lustrous, smooth and clear.
nitrophilous: of a plant that grows well in soil rich in nitrogen.
node: the point on the stem at which a leaf or leaves and accompanying organs arise (compare **internode**).
nodose: having knots or being knobby, usually in reference to roots, especially in the legumes (Fabaceae).
nucellus: the female sporangium (megasporangium) within the ovule.
nut: a one-seeded indehiscent fruit, with a hard, dry **pericarp** (the shell).
nutlet: a little **nut**.

O

ob- (*prefix*): inverse or inversely, e.g. **obovate** = inversely **ovate**.
obconic: inversely **conical**, with the point of attachment at the small end.
obcordate: more or less heart-shaped but with the narrow end below, and the broad end deeply notched.
obdiplostemonous (of a flower): with the stamens in two alternating whorls, the outer whorl opposite the petals and the inner opposite the sepals.
oblanceolate: inversely **lanceolate**; with the broadest portion nearest the apex and tapering toward the base.
oblate: transversely broadly **elliptic**.
obligate (of parasites): unable to survive without the **host** (compare **facultative**).
oblique: of unequal sides, e.g. applied to a leaf with the two sides of the blade unequal at the base.
obloid: a solid, near **elliptic** shape depressed at the poles.
oblong: much longer than broad, with nearly parallel sides.
obovate: **ovate** with the broadest part above.
obovoid: solid shape of **obovate** outline.
obsolete: reduced to a rudiment, or completely lacking (compare **rudimentary**, **vestigial**).
obtrullate: inversely **trullate**; angular-obovate, i.e. shaped like an inverted trowel, broadest above the middle with two equal sides meeting at base and two shorter straight sides meeting at apex.
obturator: a small protuberance, generally of placental origin, which grows into the space between **nucellus** and **integument**, or between the ovule and the ovary wall.
obtuse: blunt or rounded at the end.
obvolute: of a leaf folded along the midline with one margin overlapping one margin of a similarly folded leaf on the opposite side, i.e. half-**equitant**.
ocellate: with a small eye; marked with two-coloured spots having a centre of one colour surrounded by a broad ring of another.
ocrea (*pl.* **ocreae**; *adj.* **ocreate**): a tubular **stipule** sheathing the stem (e.g. in *Polygonum*—Polygonaceae).
-oid (*suffix*): indicates likeness, resemblance or similarity; or something having the form or nature of something else; e.g. **racemoid**: resembling a **raceme**; **petaloid**: resembling a **petal**.
opaque: not transparent; dull, not shining.
operculate: with a cap or lid.
operculum: (1) a lid, cap or cover; (2) the thickened tips of **integuments** of certain angiosperm ovules.
opposite: (1) pertaining to leaves or branches when two are borne at the same **node** on opposite sides of the stem; (2) one part before another, as a stamen in front of a petal.
orbicular: flat with a ± circular outline.
orifice: opening.
ornithophilous (of pollination): effected by birds.
orthotropous (of an ovule): erect so that the **micropyle** points away from the **placenta**.
osseous: bony.
ostiole: an opening or pore, e.g. at the apex of the figs of *Ficus* (Moraceae).
oval: broadly **elliptic**.
ovary: that part of the **pistil** (the usually enlarged base) which contains the **ovules** and eventually becomes the fruit.
ovate: with the outline of an egg: scarcely twice as long as broad, with the broader end below the middle.
oviform: egg-shaped.
ovoid: solid shape of **ovate** outline.

ovule: the immature seed in the ovary before fertilisation.
ovulode: a sterile **ovule**.

P

palate: in **sympetalous** corollas, the raised projection of the lower lip which closes or very nearly closes the throat.
palea (*pl.* **paleae**; *adj.* **paleate**): (1) one of the chaffy scales or thin colourless bracts amongst the flowers on the **receptacle**, in Asteraceae; (2) the inner of two bracts enclosing the **floret**, in Poaceae.
paleaceous: with small membranous scales; chaffy.
pallid: pale in colour.
palmate (of a leaf): shaped like the palm and fingers of a hand (see **digitate**).
palmatifid (of a leaf): with the margin **palmately cleft** to less than halfway to the base.
palmatilobed (of a leaf): **palmately** divided to about halfway to the midrib.
palmatipartite (of a leaf): **palmately** divided almost to the midrib.
palmatisect (of a leaf): **palmately** divided down to the midrib.
pandurate/panduriform: fiddle-shaped.
panicle (*adj.* **paniculate**): a compound **raceme**; an **indeterminate** inflorescence in which the flowers are borne on branches of the main axis or on further branches of these.
pantoporate (of a pollen grain): with apertures scattered over the whole surface.
papilionaceous/papilionoid: applied to flowers with a 'butterfly-like' appearance, as in many Papilionoideae—Fabaceae and Polygalaceae.
papilla (*pl.* **papillae**): a soft, nipple-shaped protuberance; a type of **trichome**.
papillate: having **papillae**.
papillose: covered with minute, nipple-like protuberances.
pappus: the ring of hairs or scales around the top of the fruit (as in Asteraceae) and perhaps representing the calyx limb.
papule: a pimple or small pustule.
papulose: covered with **papillae**.
papyraceous: (1) papery; (2) white as paper.
paracarpous (of an ovary): with **carpels** joined by the margins only.
paracytic: of a **stoma** accompanied on either side by one or more subsidiary cells parallel to the long axis of the pore and guard cells.
paraphyletic (of a group of taxa): derived from a single ancestral taxon, but which does not contain all the descendants of the most recent ancestor.
paraphyses: sterile, hair-like, basally attached structures.
parasite: an organism living on or in a different organism and deriving nourishment from it (compare **epiphyte**, **saprophyte**).
parchment-like: like skin or leather.
parenchyma: plant tissue consisting of mature living cells that are relatively unspecialised in function.
parietal placentation: **placentation** with the **ovules** borne on the inner surface of the wall of the **ovary** or on intrusions of the wall that form incomplete partitions or false septa (compare **axile** and **marginal placentation**).
paripinnate: of a **pinnate** leaf without an odd terminal leaflet.
-partite (*suffix*): cleft nearly but not quite to the base.
patelliform: shaped like a knee-cap.
patent: spreading out widely, e.g. patent branches.
pauciserrate: sparsely **serrate**.
pectinate: like a comb.
pedate: resembling **palmate**, but the side lobes further divided.
pedicel (*adj.* **pedicellate/pedicelled**): the stalk of an individual flower.
peduncle (*adj.* **pedunculate/ peduncled/peduncular**): the stalk of an **inflorescence**; the common stalk (**rachis** or **axis**) of several **pedicellate** or **sessile** flowers.
pellucid: translucent.
peltate: applied to a leaf, or sometimes some other organ with a stalk, of which the stalk is attached to its undersurface instead of to its edge.
pendent/pendulous (of ovules): arising on and hanging down from an apical **placenta**.
penicillate: with a tuft of hairs at the end.
penni-parallel-veined: **pinnately** parallel-veined.
penninerved: **pinnately** nerved.
pentamerous: having parts in fives or multiples of five.
perennial: a plant whose life span extends over more than two growing seasons.
perfoliate (of a sessile leaf or bract): having its base completely wrapped around the stem.
perforate (of a pollen grain): with holes less than 1 µm in diameter and generally situated in the **tectum**.
perianth: the floral envelope, consisting of **calyx** or **corolla** or both.
pericarp: the wall of the ripened ovary; its layers may be fused into one, or ± divisible into **epicarp**, **mesocarp** and **endocarp**.
periderm: secondary protective tissue derived from the **phellogen**, and replacing the epidermis.
perigone (*adj.* **perigonal**): see **perianth**.
perigynium (*pl.* **perigynia**): the **hypogynous setae** of Cyperaceae; the flask or **utricle** of *Carex* (Cyperaceae); any hypogynous **disc**.
perigynous: applied to the flower when the sepals, petals and stamens arise on an open **receptacle** surrounding the ovary but are not **adnate** to it (compare **epigynous**, **hypogynous**).
perisperm: nutritive tissue in an **angiosperm** seed, formed from the **nucellus** (compare **endosperm**).
persistent: remaining attached to the plant beyond the expected time of falling.
personate (of a flower, e.g. in Scrophulariaceae): with a two-lipped corolla in the form of a face, with an arched upper lip and a lower lip that protrudes into and nearly closes the throat of the corolla.
petal: see **corolla**.
petaloid/petaline: resembling **petals**.
petiolate: having a **petiole**.
petiole (*adj.* **petiolar**): leaf stalk.
petioled: having a **petiole**.
petiolode: the axis-like structure below the lamina and petiole (if any); it often bears the inflorescences at its distal end and sometimes shows powers of late elongation; it sometimes also produces roots (*Streptocarpus*—Gesneriaceae).
petiolule (*adj.* **petiolulate/petioluled**): the stalk of a **leaflet**.
phalloid: resembling a phallus.
phellem: cork.
phellogen: cork cambium.
phenotype: the physical characteristics of an organism; the outward expression of characteristics conferred on an organism by its **genotype**.
photonastic: one-sided growth in length of an organ due to the unrestricted action of light.

phyllary: an individual **bract** of the **involucre**, e.g. in the inflorescence of Asteraceae.
phylloclade (*syn.* **cladode**): a flattened foliaceous stem having the form and function of a leaf but arising in the axil of a minute, bract-like, often caducous, true leaf.
phyllode: a flattened **petiole** or leaf **rachis** with the form and functions of a leaf (compare **cladode**).
phyllotaxy: the arrangement of leaves on a stem.
phytomelanous (especially in seeds): black.
pilose: hairy with rather long, soft, simple hairs.
pin flower: in **heterostylous** plants, the flower type having the longer style (compare **thrum flower**).
pinna (*pl.* **pinnae**): a primary division of a **pinnate** leaf.
pinnate: like a feather in appearance; (of a compound leaf): with the leaflets arranged along each side of a common **rachis**; (of the venation of a leaf): with a middle vein and secondary veins arising from it on each side.
pinnate-parallel (of the venation of a leaf): **pinnate** with the secondary veins running parallel to each other.
pinnatifid: with the margin **pinnately** cleft but not to the midrib.
pinnatilobate/pinnatilobed: **pinnately** divided to about halfway to the midrib.
pinnatipartite: **pinnately** divided almost to the midrib.
pinnatisect: **pinnately** divided down to the midrib.
pinnule: the secondary or tertiary division of a leaf which is twice or thrice **pinnate**.
pistil: see **gynoecium**.
pistil head: see **style head**.
pistillate: pertaining to a flower with one or more **carpels** but no functional stamens; unisexual and female.
pistillode: a sterile **pistil**, often rudimentary.
pitted: marked with small depressions, punctate.
placenta: the part of the ovary, sometimes but not always thickened or raised, to which the ovules are attached (see also **free**).
placentation: the arrangement of **placentas**, and hence of ovules, within an ovary.
placentiferous: bearing a **placenta**.
plesiomorphic (of a character): common to the group under discussion and its ancestors.
plicate: folded back and forth longitudinally like a fan.
plumose: like a feather; with fine hairs branching from a central axis, e.g. the **pappus** of some Asteraceae.
plumule: see **embryo**.
pluri- (*prefix*): many-.
pluriseriate: in several to many rows.
pod: see **legume**.
polarised (of **endothecial** tissue of Asteraceae): with thickenings restricted to the horizontal cell walls.
pollen: the **microspores** of seed plants shed from **anthers**.
pollen carrier: see **corpuscle**.
pollen mass: pollen grains cohering into a single body; (= **pollinium**).
pollen presenter: a structural modification, usually a swelling, of the style around or below the stigma which enables pollen, shed in the bud, to be retained (e.g. in Proteaceae and Rubiaceae).
pollen sac: the chamber in an **anther** in which pollen is formed (see **anther**).
pollinarium (*pl.* **pollinaria**): the complex structure found in the flowers of many Apocynaceae where the pollen masses of two adjacent **thecae** are united for dispersal as a unit. The pollinarium consists of a small, ± globose, sticky body, the **corpuscle** which has two thin, elastic arms, the **caudicles**, each bearing one **pollinium**.
pollinium (*pl.* **pollinia**): a cohesive mass of pollen grains which are shed together and transported as a unit during pollination (e.g. in Apocynaceae and Orchidaceae).
polycarpic: applied to a plant which flowers and fruits often (compare **monocarpic**).
polyforate (of a pollen grain): with many pores.
polygamo-dioecious: with bisexual and male flowers on the same plant, and bisexual and female flowers on others.
polygamo-monoecious: with bisexual flowers and unisexual flowers of both sexes on the same plant.
polygamous: having unisexual and bisexual flowers on the same or on different individuals.
polymorphic: having more than two distinct morphological variants.
polypetalous: of flowers with petals free from each other (compare **gamopetalous**).
polyphyletic: composed of members that originated independently from more than one evolutionary line (compare **monophyletic**).
polyploid: having more than two of the basic sets of chromosomes in the nucleus (compare **diploid**, **haploid**).
pome: a fleshy (false) fruit, formed from an inferior ovary in which the **receptacle** or **hypanthium** has enlarged to enclose the true fruit.
porate (of a pollen grain): with rounded apertures (compare **colpate**, **colporate**).
pore: small, ± round aperture, e.g. on pollen grains.
poricidal: opening by pores.
poriferous: having many pores.
porrect: directed outward and forward; perpendicular to the surface.
posterior: in position nearest to the axis (compare **anterior/anticous**).
posticous: on the **posterior** side, next to the axis (compare **anticous**).
pouch: a bag, sack or receptacle of moderate size.
praemorse: apparently bitten off at the end.
precocious: appearing or developing early; often used of flowers which appear before the leaves.
prehensile: adapted for grasping, especially by wrapping around a support.
prickle: a sharp outgrowth from the bark or surface layer containing no conducting tissue.
primocane: the first season's shoot or cane of a biennial woody stem, as in many brambles (*Rubus* spp.—Rosaceae).
procumbent: trailing or lying on the ground without rooting at the nodes.
prolate (of a pollen grain): having a polar axis of greater length than the equatorial diameter.
proliferous: bearing **adventitious buds** on the leaves or in the flowers, capable of rooting and forming separate plants.
propagule: a structure with the capacity to give rise to a new plant.
prophyll: a leaf formed at the base of a shoot, usually smaller than those formed subsequently.
prostrate (*syn.* **procumbent**): trailing to lying on the ground without rooting at the nodes.
protandrous/proterandrous: with the **anthers** ripening before the **stigmas** (compare **protogynous**).
proterogynous: see **protogynous**.
protogynous: having the female sex organs maturing before the male ones (compare **protandrous**).

protrusion: something that projects or thrusts outwards or forwards.
protuberance (*adj.* **protuberant**): a bulge or swelling.
proximal: nearer to the point of attachment or origin; the converse of **distal**.
pruinose: having a whitish, waxy, powdery bloom on the surface.
psammophilous: sand-loving.
psammophyte: a plant which grows in sand or sandy soil.
pseud-/pseudo- (*prefix*): false, not genuine, not the true or typical.
pseudanthium: an inflorescence resembling a single flower (e.g. a **cyathium**).
pseudo-aril: false aril; see **arillode**.
pseudocolpus (of a pollen grain): a **colpus**-like streak.
pseudo-indusium: false indusium.
pseudobulb: a solid, above-ground, thickened or bulbiform stem, characteristic of some orchids.
pseudopetiolate: subsessile.
puberulent: minutely **pubescent**.
puberulous: slightly **pubescent**.
pubescent: covered with soft, short, erect hairs.
pulverulent: powdery.
pulvinate: cushion-shaped.
pulvinus: a swollen base or apex of the **petiole** or **petiolule**, often glandular or responsive to touch; a cushion.
punctate: marked with dots or translucent glands.
puncticulate: very finely **punctate**.
punctiform: reduced to a mere point.
pungent: ending in a sharp, rigid point.
pusticulate: finely **pustulate**.
pustule (*adj.* **pustulate**): a slight elevation like a pimple or blister.
putamen: the shell of a **nut**; the hardened **endocarp** of a **drupe**.
pyrene: a nutlet or kernel, the stone (**endocarp** plus seed) of a **drupe** or similar fruit (compare **berry**, **drupe**).
pyriform: pear-shaped.
pyrophyte: a plant adapted to survive severe fires.

Q

quadr-/quadra-/quadri- (*prefix*): four-.
quincuncial (applied to calyx or corolla lobes in the bud): a variant of **imbricate aestivation** with two lobes outside, two lobes inside, and one lobe which is overlapped on one side only.

R

raceme (*adj.* **racemose**): an **indeterminate** inflorescence in which the flowers are borne on **pedicels** along an unbranched axis or **peduncle**, the terminal flowers being the youngest and last to open (centripetal development).
racemiform: having the shape of a **raceme**.
rachilla (*pl.* **rachillae**): (1) the **rachis** (axis) of the spikelet in Cyperaceae and Poaceae; (2) a secondary axis, as in a **compound** leaf.
rachis (*pl.* **rachises** or **rachides**) (= **rhachis**): (1) the axis of an inflorescence in which flower stalks occur at short intervals from each other, as in Poaceae; (2) the axis of a **pinnately** compound leaf, corresponding to the midrib of a simple leaf.
radial (of **endothecial** tissue of Asteraceae): with thickenings ± evenly distributed in the walls of the cells, particularly in the radial walls.
radiate: applied to flowerheads of Asteraceae with **ray** florets.
radical: applied to leaves which arise so close to the base of the stem as to appear to arise on the root.
radicant: rooting, in particular of a stem which produces **adventitious** roots.
radicle: see **embryo**.
radicular: related to the **radicle**.
ramification: the scheme of branching or separation into branches.
ramiflorous (of flowers and fruits): borne below the current leaves on recently formed woody branches (compare **cauliflorous**).
raphe (*adj.* **raphal**): the part of a stalk of an **anatropous ovule** that is fused along the side of the ovule.
raphides: mineral substances in the form of needle-shaped crystals, within the cells of plants.
ray: (1) the florets of the margin of a flowerhead of the Asteraceae when different from those of the centre or disc; (2) one of the radiating branches of an **umbel**.
recaulescence (*adj.* **recaulescent**): a condition where the bract subtending a flower is not situated on the main axis on which the flower arises but on the pedicel.
receptacle (*adj.* **receptacular**; *syn.* **torus**): the extremity of the axis on which the parts of the flower, sepals, petals, stamens and pistil, are inserted.
recurved: curved or curled downwards or backwards.
reduplicate (of sepals or petals): with margins **valvate** and **reflexed**.
reflexed: bent downwards or backwards.
regular (= **actinomorphic**) (of a flower, calyx or corolla): radially symmetrical, i.e. capable of being dissected into similar halves in more than one vertical plane forming mirror images (compare **irregular**, **zygomorphic**).
reniform: kidney-shaped.
repand: with the margin uneven or wavy, with shallow undulations; not as deep as **sinuate**.
repent: lying or creeping along the ground.
replicate: folded abaxially along the middle, as along the midrib of a leaf.
replum: a longitudinal partition in an ovary, formed between **parietal placentas** (e.g. in Brassicaceae).
resin (*adj.* **resinous**): plant exudate, often sticky, insoluble in water.
resiniferous: yielding **resin**.
resupinate: upside down because the pedicel or ovary is twisted through 180° (as in flowers of Orchidaceae and Lobeliaceae).
reticulate: having a network-like pattern; net-veined, with the smallest veins of a leaf connected together like the meshes of a net.
retinaculum (*pl.* **retinacula**): (1) the persistent, hook-like **funicle**, as in the fruits of the Acanthaceae; (2) the structure to which the **pollinium** is attached, as in the Asclepiadaceae and Orchidaceae (see **corpuscle**).
retrofracted: bent abruptly backwards.
retrorse: bent abruptly backwards, away from the apex (compare **antrorse**).
retuse: notched.
revolute: rolled back from the margin (compare **involute**).
rhachilla: see **rachilla**.
rhachis: see **rachis**.
rhipidium (*pl.* **rhipidia**; *adj.* **rhipidial**): a ± fan-shaped **cyme** with the lateral branches developed alternately on one side and then on the other.
rhizome (*adj.* **rhizomatous**): a rootstock or root-like stem prostrate on or under the ground, sending rootlets downwards, and branches, leaves or flow-

ering shoots upwards, always distinguished from a true root by the presence of buds, leaves or scales.
rhombic/rhomboid: ± diamond-shaped; having straight margins and being widest in the middle.
riparian: of, inhabiting or situated on the bank of a river or stream.
rootstock: a short swollen structure at the junction of the root and the shoot system of a plant.
rosette: a crowded, circular cluster of leaves or other organs.
rostellum (in Orchidaceae): a projection of the upper edge of the **stigma** in front of the **anthers**; a small beak.
rostrate: beaked (see **beak**).
rostrum: any **beak**-like extension.
rosulate: with the leaves in a circle or **rosette**.
rotate: wheel-shaped; of a corolla with a short tube and spreading **limb**.
rotund: with a shape between orbicular and broadly elliptic.
rounded: margins and apex forming a smooth arc.
ruderal: a plant that grows on waste ground.
rudimentary: poorly developed and not functional (compare **obsolete**, **vestigial**).
rufescent: becoming reddish.
rufous: rusty or brownish red.
rugose: wrinkled; covered with coarse **reticulate** lines.
rugula (*pl.* **rugulae**): a fine wrinkle or fold, e.g. in the upper lip of some Acanthaceae.
rugulose: finely wrinkled.
ruminate: mottled in appearance, e.g. of bark, or of the food reserves in a seed.
runcinate: **pinnatifid** with the lobes pointing towards the base.
runner: a slender, prostrate or trailing stem which produces roots and sometimes erect shoots at its nodes (compare **stolon**).

S

saccate: pouched.
sagittate: applied to the base of a leaf or an anther with two acute, straight lobes directed downwards like in an arrow-head.
saliciform: like the genus *Salix* (Salicaceae); willow-like.
salverform/salver-shaped: shaped like a trumpet, e.g. of a **sympetalous corolla**, with a slender tube and an abruptly spreading **limb**.
samara: an indehiscent, 1-seeded fruit or **mericarp** with wings (e.g. *Securidaca* (Polygalaceae) and Malpighiaceae).
samaroid: applied to a fruit resembling a **samara**.
saponins: a group of soap-like, toxic substances.
saprophyte: an organism deriving its nourishment from dead organic matter and usually lacking chlorophyll (compare **epiphyte**, **parasite**).
saprophytic: obtaining food from nonliving organic matter.
sarcotesta: the fleshy outer coat of a seed.
saxicolous: living or growing among or on rocks.
scaberulous/scabrellous: minutely **scabrous**, slightly rough to the touch.
scabrid/scabrous: rough to the touch, usually from the presence of very short harsh hairs.
scabridous/scabridulous: somewhat rough to the touch.
scalariform: having a ladder-like pattern.
scale: (1) reduced or rudimentary leaf, usually **sessile** and **scarious** and seldom green; (2) a kind of **indumentum** in the form of small, flat discs attached by the centre; (3) any thin, usually small and dry structure.
scalloped: see **crenate**.
scandent: climbing.
scape: a naked flower stalk arising from the ground with **radical** or **rosulate** leaves.
scapigerous: possessing a **scape**.
scapose: bearing one or more flowers on a **scape**; in the form of a **scape**.
scarious: thin and dry, not green.
schizocarp (*adj.* **schizocarpic/schizocarpous**: a dry, dehiscent fruit which splits into two or more separate carpels (**mericarps**) at maturity, found e.g. in Apiaceae and Malvaceae.
schizogenous: originating by separation of cell walls along the middle lamella.
scimitar-shaped: see **acinaciform**.
sclereid: sclerenchyma cell having thick, lignified secondary walls.
scleroid: having a hard texture.
sclerophyllous: with leaves stiffened by sclerenchyma.
sclerotic: having **sclereids**.
scorpioid (of a **cymose** inflorescence): with the main axis coiled in bud, the flowers being usually 2-ranked, i.e. with single flowers alternately right and left (compare **helicoid**).
scrobiculate: pitted; marked by minute or shallow depressions.
scutate: like a small shield.
scutelliform: shaped like a dish.
sectile (of **pollinia**): compartmented.
secund: with parts or organs (branches, leaves or flowers) all directed to one side.
segment: a part or division of an organ.
sepal: see **calyx**.
sepaloid/sepaline: resembling sepals.
septal (of a **nectary**): occurring in the partitions of the ovary where the carpel walls are incompletely fused, especially in monocotyledons.
septate: divided by one or more partitions.
septicidal: referring to the dehiscence of a ripe **capsule** which splits open through the **septa** or **carpel** margins (compare **loculicidal**).
septifragal: referring to the **dehiscence** of a ripe **capsule** where the **valves** or backs of the **carpels** break away leaving the **septa** intact.
septum (*pl.* **septa**; *adj.* **septal**): dividing cross wall or partition; an internal partition of an ovary or fruit.
seriate: in rows or whorls.
sericeous: silky, with closely appressed, soft, straight hairs.
serrate: toothed like a saw, with regular, pointed teeth.
serrature: the toothing of a **serrate** leaf.
serrulate: **serrate** with minute teeth.
sessile: without a stalk; (of a **stigma**): the **style** is absent and the stigma is therefore sessile on the ovary).
seta (*pl.* **setae**): a bristle or stiff hair.
setaceous: having bristle-like hairs; bristly.
setiferous: bearing **setae**.
setiform: looking like a **seta**.
setose: beset with bristles.
setulose: a diminutive of **setose**.
sexine: the outer and/or sculptured layer of the **exine** of a pollen grain.
sheath: the (lower) portion of the leaf clasping the stem.
sigmoid/sigmoidal: double-curved in opposite directions, like the letter S.
siliceous: containing silica.
silicula (*pl.* **siliculae**): a short **siliqua**, not much longer than broad.

siliqua/silique (*pl.* **siliquae/siliques**): a dry, dehiscent fruit formed from a superior ovary of two carpels, with two parietal placentas, divided into two compartments by a thin partition (**replum**), opening by two **valves** which fall away from a frame on which the seeds are borne (e.g. in Brassicaceae).
simple: of one piece or series, the opposite of **compound**, e.g. simple leaf: not divided into leaflets; (of a hair or inflorescence): not branched.
sinistrorse: turned towards the left (compare **dextrorse**).
sinuate/sinuous: with the margin uneven, with rather deep undulations (compare **undulate**).
sinus (*pl.* **sinuses**): (1) a curve; (2) a recess between the teeth or lobes on a margin; (3) the recess formed by the basal lobes of a leaf or other organ.
siphonostele (*adj.* **siphonostelic**) (in a dicotyledonous stem): the cylinder of conducting tissue surrounding the central **parenchyma**.
sobole: a shoot, especially from the ground.
soboliferous: bearing **soboles**.
solitary: borne singly or alone.
sorus (*pl.* **sori**; *adj.* **soral**): a cluster of spores and/or **sporangia**.
spadix (*pl.* **spadices**): a flower **spike** with a fleshy or thickened axis, e.g. in Araceae and some palms (Arecaceae).
spathe (*adj.* **spathaceous/spatheate**): a large bract enclosing a **spadix**, or one or more bracts enclosing a flower or inflorescence.
spathella (*pl.* **spathellae**): (1) a capsule-like structure enclosing the flower buds in some Podostemaceae, rupturing irregularly as the pedicel elongates at **anthesis**; (2) formerly used term for the glumes of Poaceae; (3) small bracts as found in the inflorescences of Restionaceae.
spatheole: a secondary **spathe** within a **compound inflorescence** in the Andropogoneae—Poaceae.
spathulate: spoon-shaped, broadly rounded above and long and narrow below.
spatulate: see **spathulate**.
species: a **taxon** comprising one or more populations of individuals capable of interbreeding to produce fertile offspring.
spheroid/spheroidal: approximately spherical.
spicate: arranged in a **spike**.
spiciform raceme: **spike**-like **raceme**.
spiculate: having a surface covered with fine points or crystals.
spicule: a small spike.
spike: an inflorescence with the flowers **sessile** along a simple undivided axis or rachis.
spikelet: a small **spike** composed of one or more flowers enclosed by **glumes**, in Cyperaceae and Poaceae.
spine: a sharp-pointed, hardened structure modified from another organ (leaf, branch, stipule, etc.), or from part of an organ.
spine shield: in some Euphorbieae—Euphorbiaceae, the hardened bases along the angles of the stems and branches, from which the **spines** of certain species are produced.
spinescent: spine-tipped, having **spines**.
spinose: spiny or having **spines**.
spiral (of leaves or floral organs): borne at different levels on the axis, in an ascending spiral.
spiraperturate (of a pollen grain): with one or more spiral apertures.
-sporangiate (of an **anther**): containing a given number of **microsporangia/pollen sacs** (e.g. 4-sporangiate: containing four pollen sacs, as commonly found in 2-**thecate** anthers) (see **anther**).
sporangium (*pl.* **sporangia**): a hollow, unicellular or multicellular, sac-like, spore-producing structure.
sporophore: any structure bearing spores.
sporophyll: a modified leaf or leaf-like structure which bears **sporangia**.
spur: a slender, usually hollow extension of some part of the flower.
spurious: not genuine or real, false.
spur shoot: a (very) short lateral branch (= **brachyblast**).
squama (*pl.* **squamae**): a scale, usually derived from a leaf.
squamella: diminutive of **squama**, a scale of the second order or reduced in size, as in the **disc** of Asteraceae.
squamiform: scale-like.
squarrose: spreading or recurved at some point above the base, e.g. as in the **phyllaries** of some Asteraceae which are sharply curved downward or outward.
stamen (*adj.* **staminal**): in **angiosperms**, the pollen-producing structure in a flower usually consisting of an **anther** and a **filament**.
staminal column: see **androphore**.
staminal corona: fleshy outgrowth of tissue, attached dorsally to the staminal column at the base of the filament or on the backs of the anthers (compare **gynostegial corona**, **interstaminal corona**).
staminate: having stamens (usually implying that **carpels** are absent).
staminode (*adj.* **staminodial**): an abortive or vestigial **stamen** without a perfect anther.
staminophore: a structure bearing stamens.
standard: the large posterior petal (outside in the bud) of a **papilionaceous** corolla (= **vexillum**).
stele: the portion of the plant body which comprises the vascular system (xylem and phloem) and its associated ground tissue (e.g. pericycle, interfascicular regions and pith).
stelidium (*pl.* **stelidia**): lateral horn- or tooth-like appendages of the **gynostemium** of some Orchidaceae (e.g. *Bulbophyllum* spp.).
stellate: resembling a star in shape; (of hairs): with several arms radiating horizontally.
stereome (of **involucral bracts** of some Asteraceae): the thickened region in the lower part.
stigma (*adj.* **stigmatic/stigmatose**): the point or surface of the **pistil** which receives the pollen, either sessile (when there is no style) or on the top or surface of the **style** or its branches.
stipe: the stalk supporting a **carpel** or **gynoecium**.
stipel/stipella (*pl.* **stipellae**): small secondary **stipule** at the base of a leaflet.
stipitate: supported on a special stalk, or **stipe**, e.g. an ovary (e.g. in Capparaceae).
stipi(ti)form: looking like a **stipe**.
stipule (*adj.* **stipular**): leaf-like or scale-like appendage of a leaf, usually at the base of the petiole.
stipuloid: **stipule**-like.
stolon: a **runner** which roots.
stoloniferous: having **stolons**; trailing over the soil surface and rooting at the nodes.
stoma (*pl.* **stomata**): a minute pore in the epidermis of leaves, providing for gaseous exchange between the tissues and the atmosphere.
stomatose: possessing stomata.
stone cell: a ± isodiametric **sclereid**.
stramineous: straw-like or straw-coloured.

stria (*pl.* **striae**): see **striation**.
striation (*adj.* **striate**): one of a number of parallel longitudinal lines, grooves or ridges.
strigillose: finely **strigose**.
strigose: with short stiff hairs appressed to the surface.
strigulose: minutely **strigose**.
strobiliform: resembling a **strobilus**.
strobilus (*pl.* **strobili**): a cone-like structure containing the reproductive organs of one or both sexes, as in gymnosperms.
strophiole: an appendage to the **hilum** of some seeds (see also **caruncle**).
strumose: with a swelling.
strut: a rod or bar connecting parts of a structure.
style: narrow upper part of an **ovary** supporting the **stigma**.
style head/pistil head: the dilated apical part of the style or **gynostegium**, particularly in Apocynaceae.
stylidium/stylodium: a style-like **stigma**.
stylopodium: a disc-like enlargement of the base of the style (e.g. in some Brassicaceae).
sub- (*prefix*): implying 'almost', e.g. **subacute**: almost acute; **subentire**: having a very slightly uneven margin.
suberous: corky.
subtend: to have a **bud** or similar part growing in its **axil**.
subulate: awl-shaped: narrow and tapering gradually to a fine point.
succulent: a plant which accumulates water in fleshy, water-storing stems, leaves or roots; juicy, fleshy in reference to texture or appearance.
suffrutescent: like a **suffrutex**.
suffrutex: a perennial plant which is slightly woody only at the base.
suffruticose: shrubby.
sulcate: grooved, furrowed.
sulculus (*pl.* **sulculi**; *adj.* **sulculate**) (of a pollen grain): an elongated latitudinal ectoaperture not situated at a pole (compare **sulcus**).
sulcus (*pl.* **sulci**) (of a pollen grain): an elongated latitudinal ectoaperture situated at the distal or proximal pole of a pollen grain (compare **colpus**, which is usually a longitudinal aperture; compare **sulculus**, which is not situated at a pole).
superior: applied to an **ovary** when the sepals, petals and stamens are inserted below it (**hypogynous**); also when the **receptacle** bearing the calyx, corolla and stamens is prolonged so as to be separate from the ovary, but forms a cup surrounding it (**perigynous**) (compare **inferior**).
supra (*prefix*): above, on the upper side.
suture: the line of junction or seam of union, commonly used of the line of opening of a **carpel**; the dorsal (outer or anterior) suture of a carpel represents the midrib of the carpellary leaf; the ventral (inner) suture represents the united margins on which the ovules and placentas are borne.
sward: lawn; continuous grass cover produced by stoloniferous species.
syconium: a multiple fruit, or **syncarp**, with a hollow centre, e.g. the figs of *Ficus* (Moraceae).
sympetalous: having petals which are partly or completely fused (*syn.* **choripetalous**, **gamopetalous**) (compare **polypetalous**).
sympatric (of two or more taxa): having coincident or overlapping ranges of distribution (compare **allopatric**).
sympodial (of growth): without a single persisting growing point; changing direction by frequent replacement of the growing apex by a lateral growing point below it (compare **monopodial**).
synandrium: an **androecium** of a male flower with united anthers.
synanthous (of leaves): appearing together with the flowers (compare **hysteranthous**).
syncarp/syncarpium: a structure consisting of several united, usually fleshy fruits; (compare **aggregate fruit**).
syncarpous: composed of two or more united **carpels**.
synflorescence: a compound **inflorescence**.
synthecate (of anthers): with the two **thecae** having merged into one, e.g. in some Scrophulariaceae.

T

tannin: a complex yellowish or brownish aromatic compound found in many plants.
tanniniferous: producing **tannins**.
taproot: the main, descending root of a plant that has a single dominant root axis.
taxon (*pl.* **taxa**): a group or category, at any level, in a system for classifying organisms.
tectum (of a pollen grain): the outermost closed layer of the **sexine**, formed by union of the heads of the bacula.
tendril (*adj.* **tendrillar/tendrillous**): a long, slender, coiling, modified leaf, or rarely stem, by which a climbing plant attaches to its support.
tendrilliform/tendrilloid: resembling a **tendril**.
tenui- (*prefix*): slender, thin.
tenuous: thin or slender in form.
tepal: any of the members of a **perianth** that is not clearly differentiated into **calyx** and **corolla**.
terete: cylindrical, circular in transverse section.
terminal: at the apex or **distal** end.
ternate: arranged in a **whorl** or cluster of three.
ternately compound (of a leaf): with **leaflets** in threes.
terrestrial: on or in the ground.
tessellate: having a checkered pattern, e.g. with depressions.
testa: the outer coat of a seed.
tetra- (*prefix*): four-.
tetrad: a group of four spores or pollen grains derived from a spore mother cell or pollen grain mother cell as a result of meiosis, and remaining fused at maturity, e.g. in Ericaceae (compare **monad**).
tetradynamous: having six **stamens**, two of which are shorter than the others, as in most Brassicaceae.
tetragonous: 4-angled.
tetramerous: having four members in a whorl.
tetrandrous: having four **stamens**.
tetrasporangiate (of an **anther**): having four **microsporangia** or **pollen sacs**.
thalloid: resembling or shaped like a **thallus**.
thallus: a single plant body not differentiated into stem and leaves, e.g. *Lemna* spp. (Lemnaceae).
theca (*pl.* **thecae**; *adj.* **thecous/thecate**): one half of an **anther**, usually containing two **pollen sacs/microsporangia**.
thorn: a modified plant organ, especially a stem, that is stiffened and ends in a pungent point.
throat (of a tubular **corolla**): the top of the tube, where the lobes arise from the tube.
thrum flower: in **heterostylous** plants, the flower type having the shorter **style** (compare **pin flower**).
thyrse: a **panicle** with the secondary and ultimate axes **cymose**, i.e. the main axis is **indeterminate** and the lateral branches are **determinate** in their growth.
thyrsoid: like a **thyrse**.

tiller: a shoot growing from the base of a grass (Poaceae) stem; to produce tillers.
tomentellous/tomentulose: minutely **tomentose**.
tomentellum: a fine, short **tomentum**.
tomentose: densely covered with short, soft, felted hairs.
tomentum: a covering of woolly, densely matted hairs; wool.
toothed: see **dentate**.
tortuous: irregularly twisted or twining.
torulose: cylindrical with contractions or swellings at intervals.
torus: see **receptacle**.
trabeculate: cross-barred.
trace: a strand of vascular tissue connecting the stem with a leaf or reproductive organ.
translator: see **corpuscle**.
translator arm: see **caudicle**.
trapeziform: a figure of four straight, unequal sides.
tri- (*prefix*): three; thrice.
triad: a group of three.
trichome: an epidermal outgrowth, such as a hair or scale.
trichotomous: forking regularly into three.
trifid: deeply divided into three parts.
trifoliate: having three leaves.
trifoliolate: having three **leaflets**.
trigonous: triangular in cross section and with obtuse angles (compare **triquetrous**).
trilete (e.g. of spores): having three scar lines forming a 'Y', or basically tetrahedral.
trimerous: in threes, e.g. of a flower with three sepals, three petals, etc.
tripartite: divided into three parts.
tripinnate (of leaves): thrice **pinnately** divided.
triporate: with three pores.
triquetrous: triangular in cross section and with acute angles, therefore with three distinct longitudinal ridges (compare **trigonous**).
tristichous (of leaves on a stem): arranged in three vertical rows.
tristylous (said of a **heterostylous** species): having three style lengths (short, mid, long); the flowers of any one plant having styles of the same length.
trullate/trulliform: trowel-shaped; having its widest axis below the middle and with straight margins.
truncate: cut off ± squarely at the end.
tuber: (1) a thickened branch of an underground stem, which produces buds; (2) a swollen root or branch of a root acting as a storage organ.
tubercle: a small, wart-like outgrowth.
tuberculate: covered with wart-like protuberances or knobs.
tuberous: swollen; (of roots): **tuber**-like.
tuft (*adj.* **tufted**): clump, cluster.
tuft domatium: a **domatium** supplied with or consisting of hairs.
tumid: swollen, enlarged.
tumulus (*pl.* **tumuli**): a small mound.
tunic (*adj.* **tunicate**) (of a **bulb** or **corm**): a loose membranous or fibrous outer skin which does not develop from the epidermis.
turbinate/turbiniform: shaped like a top; obconical.
turgid: swollen due to a high water content (compare **flaccid**).
turion: (1) a young shoot or sucker which is produced from an underground stem; (2) a perennating winter bud which is separated from the parent and gives rise to a new plant in spring.
tussocky: tufted as in some grasses or grass-like plants.

U

umbel (*adj.* **umbellate**): a **racemose** inflorescence in which all the divergent pedicels or **rays** arise in a cluster at the top of the peduncle and are of about equal length; **compound umbel**: each ray bears an umbel, each of the latter called a partial umbel; **simple umbel**: each ray terminates in a flower.
umbellule: a secondary **umbel** in a compound umbellate inflorescence.
umbo (*adj.* **umbonate**): a blunt or rounded projection arising from a surface, as on a pine-cone scale.
uncinate: terminating in a hooked point.
undulate: wavy on the margin (compare **sinuate**).
unguiculate (of petals): having a narrow **claw**-like base.
uni- (*prefix*): one-.
unifacial: one-faced; (of leaves): folded sharply in half along the midline so that the adaxial surface is hidden; or filiform to ± cylindrical with a ± continuous palisade layer (see also **centric**).
unifarious (of the **indumentum** of a stem): restricted to one side or vertical line.
unifoliate: having only one leaf.
unifoliolate: of a **compound** leaf which is reduced to a single, usually terminal, **leaflet**; the **petiolule** is distinct from a **petiole**.
unilateral (of stamens): with **anthers** grouped on one side of the **style**.
unilocular (of an ovary or fruit): having only one internal cavity.
unisexual: bearing only male or only female reproductive organs.
united: fused together.
unitegmic (of an **ovule**): with one **integument**.
unithecate/unithecous (of an **anther**): with one **theca**.
urceolate: urn-shaped, with a short swollen tube contracted near the top and then slightly expanded in a narrow rim.
urticate: to cause a burning or itching sensation.
utricle: bladder-shaped structure, applied (1) to the traps of *Utricularia* (Lentibulariaceae); (2) to the fruits of e.g. some Cyperaceae, such as *Carex*, and of Lemnaceae.

V

vagina: sheath.
vallecular (of grooves between ridges): e.g. in the fruits of Apiaceae and Asteraceae.
valvate: having the edges of **petals** or **sepals** touching without overlapping
valve (*adj.* **valvar**): one of the parts produced by the splitting of a **capsule** when ripe.
vascular: specialised for the conduction of fluids; **vascular plant**: plant containing specialised conducting tissues.
vegetative (of plant organs or parts): having non-reproductive functions, e.g. leaves, roots, stems, etc.
veins: strands of **vascular** tissue (compare **nerves**).
velamen: water-retaining outer layer of the aerial roots of some epiphytes, especially Orchidaceae.
velum: a veil; a membranous covering.
velutinous: velvety.
velvety: with a coating of fine soft hairs.
venation: the arrangement of **veins** of a leaf or other organ.
venose: having veins.
ventral (of a lateral organ): the upper or inner face or the surface facing the axis; (of a **thallus**): the surface facing the substrate (compare **dorsal**).
ventricidal: of the dehiscence of a fruit which splits down the **ventral** (axile) side of the locules.

ventricose: swollen or bulging on one side; unequally inflated.
vermiform: shaped like a worm.
vernation: the arrangement of unexpanded leaves in a bud (compare **aestivation**).
verruciform: resembling a wart.
verrucose: warty.
verruculose: finely warty.
versatile (of an **anther**): swinging freely about the point of attachment to the **filament** which is ± in the middle of the back (compare **basifixed**, **dorsifixed**, **medifixed**).
verticil: a whorl or circular arrangement of similar parts around an axis, at the same level.
verticillaster: a false **whorl** of opposed dense **cymes**, especially in Lamiaceae.
verticillate: arranged in one or more **whorls**.
vesicle: a small sac or cavity; a spherical body.
vesicular: pertaining to, having, or composed of, **vesicles**.
vestigial: of an organ now degenerate and of little or no utility (compare **obsolete**, **rudimentary**).
vestiture: any covering on a surface, e.g. plant **trichomes**.
vexillum (*adj.* **vexillary**): the uppermost (or posterior) **petal** of a **papilionaceous** flower (= **standard**).
vibratile: capable of vibration.
villous: beset with long, weak hairs (compare **hirsute**).
virgate: with many long, slender, ± straight, ascending, almost parallel stems.
viscid: sticky, glutinous.
viscidium (in Orchidaceae): a **viscid** part of the **rostellum**, which is clearly defined and removed with the **pollinia** as a unit, and serves to attach the pollinia to an insect or other pollination agent.
viscidulous: slightly sticky.
viscous (of a liquid): thick and sticky.
vitta (*pl.* **vittae**): aromatic oil tubes in the fruit of some Apiaceae.
viviparous: with seeds or buds germinating or sprouting while attached to the parent plant.
voluble: twining or twisting.

W

whorl (*adj.* **whorled**): (1) a group of three or more parts at a **node**, e.g. leaves or branches; (2) a circle of floral organs, e.g. stamens, petals, carpels.
wing (*adj.* **winged**): (1) any flat membranous expansion; (2) a thin flange of tissue extended beyond the normal outline of a stem or petiole; (3) one of the two lateral petals of a **papilionaceous** flower; (4) one of the **petaloid** sepals of the flower in Polygalaceae.

X

***x*/basic chromosome number**: the number of chromosomes in the original **genome** (**haploid** set) from which a **polyploid** or a group of polyploid forms or species is known or postulated to have arisen.
xerochastic: applied to plants of which the fruits burst by desiccation and their seeds or spores are scattered.
xeromorphic (of plants or plant parts): having characteristics that serve as protection against excessive loss of moisture.
xerophyte (*adj.* **xerophytic**): a plant that is adapted to dry or arid habitats.

Z

zonasulculate (of a pollen grain): with a ring-like **sulcus** around the equator.
zonatriporate (of a pollen grain): with three pores equatorially.
zygomorphic: applied to flowers which are bilaterally symmetrical, i.e. capable of being bisected into identical halves in one plane only, forming mirror images; (= **irregular**) (compare **actinomorphic**, **regular**).

INDEX TO FAMILIES AND GENERA

Current names of local families and genera are in bold, synonyms are in italic type. A bold page numer refers to the main reference and description of a taxon. Exotic taxa are not marked in the Index.

The following symbols and the order are given for current families to indicate their placing in the classification system according to A.P.G. (1998) and Judd *et al.*(1999) outlined on pp. 4–6: **E** – eudicots (p. 5), **Ea** – eudicots: asterids (p. 6); **G** – gymnosperms (p. 4); **M** – monocots (p. 6); **Ms** – monosulcates (p. 4); ? – position uncertain; unplaced families are listed after asterids (p. 6).

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